

ABSTRACT

This report describes and assesses significant structural changes in the food marketing industries during the past two decades. Chapters are included on processing; retailing; wholesaling; away-from-home eating; particular commodities, such as livestock and meat, and fruits and vegetables; and transportation. A total of 604,000 establishments were primarily engaged in marketing food products in 1967, consisting of 23,000 food processing plants, 50,000 assemblers and wholesalers, 294,000 foodstores, and 237,000 eating places. In nearly all commodity industries, processing plants are becoming fewer in number and larger. Total food processing plants declined a fourth between 1958 and 1967, while value of shipments per plant nearly doubled. The level of industry concentration varied widely among food processing industries. In nine of 30 industries, the four largest firms in each industry accounted for over half that industry's value of shipments in 1967. Number of grocery stores fell 16 percent between 1958 and 1967, practically all of the decrease among small stores. Number of stores run by firms operating 101 or more units rose a fourth between 1963 and 1967. Growth in both number and sales of merchant wholesale establishments affiliated with retail foodstores has been the principal development in the wholesale grocery trade. Sales of eating places have been growing much faster than those of foodstores. Number of eating places has increased slightly.

Keywords: Food marketing, Market structure, Industry concentration, Food distribution, Food processing, Commodities.

FOREWORD

The marketing system for foods grown on American farms is big and dynamic. During the past two decades and more, many structural changes have occurred in number and size of firms, concentration of output, marketing channels, types of organizations, and types of buying and selling arrangements. Such long-term developments created the need for an overall assessment of changes during the last two decades in the structure of food marketing industries.

This report was prepared by the following staff members of the Marketing Economics Division, Economic Research Service, U.S. Department of Agriculture:

Denis F. Dunham, study coordinator
Duane D. Hacklander and James A. Maetzold, livestock and meat
Alden C. Manchester and Floyd A. Lasley, dairy products
Kenneth E. Blase and George B. Rogers, poultry and eggs
Theo F. Moriak, grains
Victor G. Edman, fruits and vegetables
Thomas B. Smith, fats and oils
Roy A. Ballinger, sugar
Denis F. Dunham, retailing
Leland W. Southard, wholesaling
Michael G. Van Dress, food service
John O. Gerald and Patrick P. Boles, transportation

CONTENTS

	<u>Pg</u>
Summary	1
Introduction	
Food Processing	
Number of Plants	
Plant Size	
Location of Plants	
Type of Organization	
Industry Concentration	
Livestock and Meat	1
Marketing Channels	1
Slaughtering Plants	1
Meat Processing Plants	1
Wholesaling	18
Prospects	27
Dairy Products	27
Producer Cooperatives	27
Number of Plants	27
Distribution	26
Integration by Supermarkets	26
Industry Concentration	34
Poultry and Eggs	37
Egg Production and Marketing	37
Poultry Processors	44
Poultry and Poultry Product Wholesalers	47
New Product Developments and New Marketing Techniques	47
Future Trends	49
Grains Used for Food	51
Grain Elevators	51
Grain Milling	51
Bakery Products	55
Macaroni and Spaghetti	58
Outlook	59
Fruits and Vegetables	59
Processing Industries	60
Fresh Fruit and Vegetable Wholesaling	71
Fats and Oils	76
Number of Plants	77
Size of Plant	77
Concentration	80
Improvements	80
on	82
.....	82
.....	83
..... ³	83
Sugar Industry	84
Beet Sugar Industry	87
Nonsugar Sweetener Industries	87
Market Conduct and Performance	88
Buyer Concentration	89

	<u>Page</u>
iv Food Trade	91
1 Retail Foodstores	91
2 Grocery Stores	91
2 Convenience Stores	97
2 Discount Stores	97
5 Specialty Foodstores	98
5 Foodstore Mergers and Acquisitions	98
5 Wholesale Trade	98
8 Merchant Wholesalers	99
8 Manufacturers' Sales Branches and Offices	101
1 Agents and Brokers	101
1 Assemblers of Farm Products	101
3 Food Service	103
5 Number and Type of Establishments	103
8 Value of Food	104
1 Establishment Characteristics	104
1 Source of Food Supply	106
2 Growth and Prospective Changes	107
3 Transportation	109
5 Railroads	109
5 Trucks	111
8 Water Carriers	115
8 Air Transport	115
8 Implications of Intermodal Competition	115
Literature Cited	119

SUMMARY

In 1967, 604,000 establishments were primarily engaged in marketing food products originating on U.S. farms, 3 percent less than in 1963 and 10 percent less than in 1958. From 1950 to 1970, the structure of food marketing industries, such as number and size of establishments and industry concentration, was changing, most conspicuously in retailing. Food processing, wholesaling, and assembly of farm products have also experienced significant changes. Technological developments and opportunities for economies of size have had a major part in the trend.

From 1958 to 1967, number of grocery stores fell 16 percent and the decline has continued. Most of the decrease was in small stores and in those operated by single-unit firms. Average sales per store nearly doubled in the period. Supermarkets--stores with annual sales of \$500,000 or more--made three-fourths of total grocery store sales in 1967, although accounting for only 15 percent of all grocery stores.

Number of stores operated by multistore firms has increased. In 1967, 39 firms with 101 or more grocery stores operated 19,655 stores, representing 9 percent of total grocery stores and 36 percent of grocery store sales.

Mergers and acquisitions have also helped change the structure of food retailing. However, merger pace of the 20 largest food chains has dropped off sharply since 1964, primarily in response to regulatory activities of the Federal Trade Commission (FTC). During the 1950's, the 20 largest chains accounted for nearly three-fourths of the sales of acquired firms. In 1965, the share had dropped to 10 percent and by 1968, to 6 percent.

Consumers are spending more of their food dollar in eating places. Between 1960 and 1970, sales of eating places nearly doubled, and number of eating places rose slightly. The foodservice industry is dominated by single-unit firms, although multiunit firms have been growing in importance. In 1967, firms with 11 or more units accounted for about 14 percent of sales, up from 9 percent in 1958.

Wholesalers affiliated with their retail foodstore customers are the major force in general-line food wholesaling. Number of affiliated wholesalers increased 35 percent between 1958 and 1967 and their sales more than doubled. Their growth has occurred because both wholesalers and independent retailers have realized that economies of size were necessary for effective competition with integrated chains. Merchant wholesalers specializing in selected items, such as dairy products, have maintained an important position by supplying the fast-growing away-from-home market, as well as foodstores. Specialty wholesalers declined 5 percent from 1958 to 1967, but their sales rose 55 percent.

Total plants processing and manufacturing food products originating on farms declined 24 percent between 1958 and 1967. However, total output rose 38 percent, and output per plant increased 82 percent. Technological improvements, merger activity, and relatively slow rate of growth in output of some industries have been the major reasons for decline in plant numbers.

In most food manufacturing industries, a large proportion of plants are single-unit establishments. In 1967, three-fourths of all food processing plants were single-unit. Multiunit, though only one-fourth of total plants, dominated output, accounting for 76 percent of value added by manufacture.

In nine of 30 food manufacturing industries, the four largest firms in each industry accounted for over 50 percent of their industry's total value of shipments in 1967. Concentration among the four largest firms did not change appreciably between 1963 and 1967. Proportion of total shipments made by these firms increased in each of 11 industries, stayed the same in six, and decreased in 13.

Livestock and meat marketing has changed significantly in the past decade. Proportion of livestock purchased by meatpackers at terminal markets declined substantially, as did livestock traffic of the railroads--from about 5 million tons in 1954 to less than 1 million in 1969. Increased direct purchases and auction sales accounted for the relative decline in packer purchases at terminal markets. Number of livestock slaughtering plants, excluding small nonfederally inspected plants, has increased, particularly in the West North Central Region of the country. The largest meatpacking firms now account for a smaller proportion of total slaughter than in earlier years. Number of meat processing plants and concentration of output among the largest firms has remained fairly constant.

In 1971, there were less than half as many fluid milk bottling plants as in 1964 and less than one-fourth the number in 1954. Also, plants manufacturing dairy products have declined at a slightly slower rate than have fluid milk plants. Technological developments and shifts in the economies of size curve were mainly responsible. Eight large dairy companies are significant in the market for all types of dairy products. Despite the rapid decline in plant numbers, concentration in dairy product industries has changed little in the past few decades.

Larger but fewer egg packing plants are handling an increasing share of egg production. Plants producing frozen eggs under Federal inspection and grading programs decreased from 1960 to 1970, but those producing dried eggs increased. Number of plants slaughtering and eviscerating poultry under Federal inspection and grading programs fell around 15 percent between 1964 and 1970, while output increased 45 percent. Large plants processing 30 million or more pounds of poultry annually about doubled, representing almost half of all federally inspected plants and nearly four-fifths of output in 1970. Integrated operations have accounted for a growing proportion of poultry and egg production and marketing over the past 15 years.

Decreases have occurred in number of plants milling and processing grain products. Plants producing bread and related products declined from almost 6,000 in 1958 to 4,000 in 1967. Plants producing flour and other grain mill products also fell substantially. Number of country elevators rose between 1954 and 1963 but dropped to the 1954 level--about 6,500--in 1967. Number of terminal elevators rose during the past decade, probably reflecting their greater relative efficiency compared with country elevators.

Plants canning fruits and vegetables decreased about a third from 1954 to 1967, mostly among establishments with less than 100 employees. In contrast, number of freezers more than doubled, although declining slightly between 1963 and 1967. In 1967, the freezing industry was about half the size of the canning industry in number of plants and value added by manufacture. Concentration of shipments of processed fruits and vegetables among the largest firms changed little during the 1960's but was below 1950 levels. Assemblers of fresh fruits and vegetables dropped about one-half between 1963 and 1967, while merchant wholesalers and agents and brokers increased slightly.

In the fats and oils industry, the number of soybean oil mills has remained relatively constant, reflecting a sharp growth in soybean production. However, the four largest firms' share of total output increased between 1954 and 1967. Number of cottonseed processing mills declined about 50 percent between 1954 and 1967. Plants manufacturing consumer products--namely, shortening and cooking oils--increased slightly from 1958 to 1967. Concentration of output remained constant, with the four largest firms accounting for over two-fifths of total output.

Sugarcane and sugarbeet production in the continental United States has increased substantially since 1958, although number of growers of both crops has decreased markedly. Number of companies processing cane and beets has altered little. As a result, average output of individual growers and processors has risen. Four companies produced one-half the volume of refined sugar manufactured in the United States in 1969. Since 1958, several companies processing sugarcane and sugarbeets have become divisions of larger diversified corporations with interests outside the sugar industry.

Much of the structural change in the food marketing industries during the past few decades could not have occurred without a strong, flexible, and yet relatively low cost national transportation system. In fact, changes in structure and performance of the transportation industries may have induced some of the changes in the food marketing industries. Growing competition among railroads, truckers, waterway operators, and air carriers has increased transportation possibilities available to food marketers.

MARKET STRUCTURE OF THE FOOD INDUSTRIES

by

Marketing Economics Division

INTRODUCTION

Many structural changes have occurred in the farm products marketing system during the past two decades or more. In nearly every line of business, firms have declined in number and risen in size. Output of most industries has been increasingly concentrated among the largest firms. Retailing, wholesaling, and food manufacturing have grown more integrated. Technological developments, improved transportation possibilities, and economies of size represent the major explanations for the changes.

To the extent that alterations in market structure have increased efficiency or improved product variety and quality, agricultural producers and consumers, as well as marketing firms, have benefited. However, producers and consumers frequently express concern about other consequences of changes in market structure, particularly as to the extent and type of competition among firms.

Producers are perhaps most concerned about increasing concentration and backward integration of marketing activities. As marketing activities are performed or controlled by a smaller number of firms, producers' bargaining power may be impaired. Moreover, large food retailing organizations and food processors are likely to possess more extensive and current information about market conditions than are producers.

Consumers are concerned about the efficiency and performance of marketing industries because charges for processing and distribution services account for about two-thirds of the total retail cost of farm foods. Market structure is widely recognized as a relevant variable affecting conduct and performance of food industries, although precise correlation of structure and performance has not been possible.

The study reported on here was undertaken to identify and measure some of the broad changes which have occurred in the structure of food marketing industries in the past two decades. Where possible, these changes have been related to changes in the behavior of firms and the overall performance of food industries. However, it was beyond the purpose of this study to analyze in great detail the performance of the marketing system.

Market structure consists of characteristics which determine the relationship of sellers and buyers in the market. In turn, this association influences competition and market performance. Characteristics most frequently cited as important aspects of market structure are number and size of firms operating within the market, location of plants, product differentiation, barriers to entry of new firms, industry concentration, and extent of vertical integration. Integration may exist either through ownership of facilities or control of various levels in the production and marketing system through use of contracts and agreements.

The study was a joint undertaking, consisting of investigations by research specialists in major commodity and functional areas of food marketing. This report contains a general overview of the food processing sector, an analysis of developments in assembling, processing, and wholesaling for particular commodity classes, and discussions on the trade and transportation industries. Transportation was included because of its crucial significance in food marketing.

Since availability of information differed, some dissimilarities exist among sections of this report as to treatment of industry scope, analyses of market levels, and emphasis on relevant variables. Much of the analysis is based on Census data, the most recent being 1967. These data represent the most complete information for measuring quantitatively the structural characteristics of most food industries. Most of the chapters on individual industries contain later data from other secondary sources, including trade journals and statistics collected by Government regulatory agencies. Most of the statistics and analysis are for structure on an industry, hence, national scale.

FOOD PROCESSING

Number of Plants

In nearly all food processing industries, plants are falling in number and increasing in size. Establishments primarily producing food from domestic farm-produced raw materials totaled 23,167 in 1967, down 24 percent from 1958 (table 1). 1/ Number of plants declined in eight of the nine major groups of processing industries. 2/ Industry groups with the largest percentage declines in plants were dairy products (37 percent), bakery products (30 percent), and grain mill products (23 percent). In contrast, although there were relatively few plants in the sugar industry, their number rose slightly from 1958 to 1967.

Despite the general decrease in plants, output of all processing industry groups rose between 1958 and 1967. Total value of shipments increased 38 percent and value added by manufacture rose 47 percent. Slow growth in output may have accounted, in part, for the above-average decrease in number of dairy and bakery product plants. Output of these two industries rose 27 percent, the smallest increase of all industry groups.

1/ Census data are for establishments, which generally are plants. An establishment is classified in a particular industry if its production of primary products of that industry exceeds in value its production of products of any other single industry. Establishments are not necessarily identical with companies or firms, which may consist of one or more establishments.

2/ These nine groups represent 32 industries whose primary products are manufactured from domestic farm-produced raw materials. More detailed information on structure of these industries is contained in commodity chapters of this report. Twelve food and kindred product industries, including beverages, coffee, fish and seafoods, and ice, are excluded.

Table 1.--Food manufacturing industries: Companies and establishments, employees, value of shipments, and value added by manufacture, 1958, 1963, and 1967

Industry	Companies	Establishments	Employees	Value of shipments	Value added by manufacture
	Number	Number	Thousand	Mil. dol.	Mil. dol.
Food manufacturing, total:					
1958	N.A.	30,397	1,370	47,806	13,106
1963	N.A.	26,823	1,305	54,580	15,925
1967	N.A.	23,167	1,300	66,244	19,249
Percentage change, 1958-67		-24	-5	38	47
Meat products:					
1958	N.A.	5,537	312	15,927	2,502
1963	N.A.	5,300	300	16,807	2,883
1967	4,492	4,914	310	21,520	3,551
Percentage change, 1958-67		-11	-5	35	42
Dairy products:					
1958	N.A.	9,899	295	10,082	2,876
1963	N.A.	7,885	257	11,200	3,185
1967	5,141	6,188	232	12,815	3,466
Percentage change, 1958-67		-37	-21	27	20
Canned, cured, and frozen foods: <u>1/</u>					
1958	N.A.	2,920	199	5,007	3,242
1963	N.A.	3,017	208	6,457	2,486
1967	N.A.	2,711	223	8,151	3,242
Percentage change, 1958-67		-7	12	63	85
Grain mill products: <u>2/</u>					
1958	N.A.	1,105	62	3,651	1,057
1963	N.A.	965	58	4,281	1,287
1967	N.A.	847	58	5,098	1,655
Percentage change, 1958-67		-23	-6	40	56
Bakery products:					
1958	N.A.	6,319	302	5,081	2,642
1963	N.A.	5,366	280	5,656	3,031
1967	3,720	4,390	264	6,466	3,495
Percentage change, 1958-67		-30	-12	27	32

Continued.

Table 1.--Food manufacturing industries: Companies and establishments, employees, value of shipments, and value added by manufacture, 1958, 1963, and 1967--Continued

Industry	Companies	Establishments	Employees	Value of shipments	Value added by manufacture
	Number	Number	Thousand	Mil. dol.	Mil. dol.
Sugar:					
1958	N.A.	170	33	1,568	383
1963	N.A.	164	32	2,414	591
1967	93	182	31	2,305	652
Percentage change, 1958-67		7	-6	47	70
Confectionery and related products:					
1958	N.A.	1,444	80	1,862	752
1963	N.A.	1,263	78	2,158	956
1967	1,128	1,240	83	2,694	1,248
Percentage change, 1958-67		-14	4	45	66
Fats and oils: <u>3/</u>					
1958	N.A.	482	31	3,055	467
1963	N.A.	452	30	3,587	560
1967	N.A.	408	30	4,516	713
Percentage change, 1958-67		-15	-3	48	53
Miscellaneous foods: <u>4/</u>					
1958	N.A.	2,521	56	1,573	672
1963	N.A.	2,411	62	2,020	946
1967	N.A.	2,287	69	2,679	1,227
Percentage change, 1958-67		-9	23	70	82

1/ Excludes canned and cured seafoods and fresh and frozen packaged fish.

2/ Excludes prepared animal feeds.

3/ Excludes animal and marine fats and oils.

4/ Macaroni and spaghetti manufacturers and establishments producing food preparations not elsewhere classified, such as potato chips, sweetening syrups, and peanut butter.

Note: NA = Not available.

Source: Bureau of the Census, Census of Manufactures, U.S. Dept. Commerce.

Technological change has undoubtedly been a major cause of the decrease in plant numbers. Many older and smaller plants have been closed because they could not compete with larger, more modern ones. Capital expenditures for new plants and equipment by farm food processing industries amounted to \$190 million in 1967, \$916 million in 1963, and \$710 million in 1958. Since firms generally build plants and install equipment to accommodate an expected increase in output, new or modernized plants have probably been bigger than existing ones. Consequently, firms have been able to turn out products with fewer plants.

Mergers of companies have probably accounted for part of the reduction in plant numbers. Companies that acquire other firms may concentrate production in their most efficient plants and close the least efficient ones. Data compiled by the FTC show that food and kindred products manufacturers acquired a total of 972 concerns between 1960 and 1970 (1) 3/. Number of acquisitions per year ranged from 56 in 1962 to 155 in 1969.

Plant Size

Average output per plant rose in all nine major processing industry groups between 1958 and 1967. For all groups combined, value of shipments per plant rose 82 percent. Increases in output per plant ranged from 37 percent in the meat industry to 103 percent in the dairy industry. Output per plant in most other industries rose between 70 and 90 percent.

The increase in average size of plant also is indicated by the size of work force. Large plants (100 or more employees) increased 7 percent from 1958 to 1967. But medium-sized plants (20-99 employees) decreased 20 percent and small plants (1-19 employees), 30 percent (table 2).

Of all food manufacturing plants, 15 percent were in the largest plant size group in 1967, compared with 10 percent in 1958. The medium-sized group accounted for about 28 percent of total number in 1967, up slightly from 26 percent in 1958. Small plants dropped from 63 to 58 percent. Though more than half of all plants were small in 1967, this size group accounted for only about 5 percent of total value added by manufacture.

Location of Plants

Food manufacturing plants are fairly evenly located in all four major geographic areas of the country (table 3). In 1967, a third of total plants were located in the North Central Region, about a fourth in the Northeast, another fourth in the South, and a sixth in the West. Number of plants declined in all regions between 1958 and 1967, although decreases were somewhat greater in the Northeast and North Central regions than in the other two, largely reflecting a substantial decline in dairy plants. Consequently, between 1958 and 1967, the proportion of total food manufacturing plants located in the South and West rose slightly.

3/ Underscored numbers in parentheses refer to items in Literature Cited.

Table 2.--Food manufacturing establishments, by size of work force, 1958, 1963, and 1967

Industry and year	Total establishments	Establishments with average of--				
		1-19 employees	20-99 employees	100-499 employees	500 or more employees	
		Number				
All industries:						
1958	30,371	19,182	8,014	2,879	296	
1963	26,823	16,348	7,197	2,984	301	
1967	23,167	13,383	6,371	3,081	332	
Meat products:						
1958	5,537	3,470	1,430	550	87	
1963	5,300	3,283	1,328	606	83	
1967	4,914	2,884	1,284	657	89	
Dairy products:						
1958	9,899	6,583	2,665	626	25	
1963	7,885	4,999	2,248	619	19	
1967	6,188	3,683	1,880	611	14	
Canned, cured, and frozen foods:						
1958	2,920	1,405	998	474	43	
1963	3,017	1,494	964	504	55	
1967	2,711	1,271	835	531	74	
Grain mill:						
1958	1,105	723	254	108	20	
1963	965	588	249	109	19	
1967	847	481	249	96	21	
Bakery products:						
1958	6,319	3,967	1,556	726	70	
1963	5,366	3,254	1,336	702	74	
1967	4,390	2,582	1,029	704	75	
Sugar:						
1958	144	9	52	68	15	
1963	164	4	50	96	14	
1967	182	20	57	91	14	
Confectionery and related products:						
1958	1,444	983	302	129	30	
1963	1,263	812	288	136	27	
1967	1,240	778	278	153	31	
Fats and oils:						
1958	482	136	266	75	5	
1963	452	120	253	75	4	
1967	408	108	214	81	5	
Miscellaneous foods:						
1958	2,521	1,906	491	123	1	
1963	2,411	1,794	474	137	6	
1967	2,287	1,576	545	157	9	

Source: Bureau of the Census, Census of Manufactures, U.S. Dept. Commerce.

Table 3.--Location of food manufacturing establishments, 1958 and 1967

Industry and year	Location of establishment				
	Northeast	North Central	South	West	United States
	<u>Number</u>				
All industries:					
1958	8,117	10,660	6,953	4,612	30,342
1967	5,889	7,646	5,620	4,012	23,167
Meat products:					
1958	1,145	1,901	1,655	827	5,528
1967	901	1,633	1,623	757	4,914
Dairy products:					
1958	2,700	4,618	1,470	1,091	9,879
1967	1,624	2,807	957	800	6,188
Canned and frozen foods:					
1958	651	781	714	774	2,920
1967	581	713	622	795	2,711
Grain mill products:					
1958	142	307	518	138	1,105
1967	117	270	336	124	847
Bakery products:					
1958	2,276	1,864	1,323	856	6,319
1967	1,615	1,174	955	646	4,390
Sugar:					
1958	10	26	60	48	144
1967	16	26	72	68	182
Confectionery and related products:					
1958	542	391	289	222	1,444
1967	438	316	254	232	1,240
Fats and oils:					
1958	28	107	276	71	482
1967	32	103	212	61	408
Miscellaneous foods:					
1958 (estimated)	623	665	648	585	2,521
1967	565	604	589	529	2,287

Source: Bureau of the Census, Census of Manufactures, U.S. Dept. Commerce

Type of Organization

Information on whether plants are independent or part of a multiestablishment company contributes to understanding the structure of food manufacturing. In most industries, a small proportion of the plants are multiunit; that is, they are operated by companies with other plants. In 1967, 25 percent of all plants operated by the nine industries processing farm foods were multiunit, up from 21 percent in 1958. The proportion of multiunit plants ranged from 16 percent in the meat products industry to 70 percent in the sugar industry. Aside from the sugar industry, multiunit plants were in the majority only in the fats and oils industry (table 4).

Although multiunit plants only made up one-fourth of all food manufacturing plants, they accounted for well over half the total value added by manufacturing. In 1967, multiunit plants accounted for 76 percent of value added, up from 69 percent in 1958. Multiunit plants represented over 90 percent of value added by manufacturing in three of the nine industry groups--grain milling, sugar, and fats and oils.

Industry Concentration

Concentration is widely used in describing industry structure, although a considerable range of viewpoints exists concerning implications of different concentration levels on competition and market performance. A commonly employed measure of industry concentration, and the one used here, is the percentage of total shipments made by the largest firms. Most concentration percentages, including those shown in table 5, are based on the Census of Manufacturers four-digit classification of industries.

A frequently cited shortcoming of concentration as a measure of competitive behavior is that the largest firms in four-digit industries are treated as a unit, when, in fact, their products may not compete to a very great extent in the market. Moreover, competition among food manufacturing firms depends on a number of other market factors, such as ease of entry of new firms and product substitutability. Although limited in their use, concentration percentages do describe an important structural dimension of food manufacturing industries and provide a basis for assessing the state of competition.

The level of industry concentration varies widely among food manufacturing industries. In nine of the 30 food manufacturing industries, the four largest firms in each industry accounted for over 50 percent of their industry's total value of shipments in 1967. In contrast, concentration was 25 percent or less in seven industries. The highest level of concentration was in the cereal industry; the four largest firms accounted for 88 percent of industry shipments. Other industries with relatively high concentration were canned specialties, 69 percent; wet-corn milling and blended and prepared flour, 68 percent; beet sugar, 66 percent; and cookies and crackers, 59 percent. Least concentrated industries in 1967 were sausage and other prepared meats; poultry dressing; and creamery butter, which had a ratio of 15 percent.

Table 4.--Type of operation of food manufacturing establishments, 1958, 1963, and 1967

Industry	Multiunit companies		Single-unit companies	
	: Value added :		: Value added :	
	: Establishments:	by	: Establishments:	by
		: manufacture :		: manufacture :
	<u>Number</u>	<u>Mil. dol.</u>	<u>Number</u>	<u>Mil. dol.</u>
All industries:				
1958	6,348	8,955	23,994	4,038
1963	6,181	11,773	20,642	4,152
1967	5,862	14,707	17,305	4,543
Meat products:				
1958	742	1,436	4,786	1,063
1963	756	1,721	4,544	1,162
1967	791	2,116	4,123	1,435
Dairy products:				
1958	2,099	1,769	7,780	1,098
1963	1,889	2,141	5,996	1,044
1967	1,624	2,471	4,564	995
Canned, cured, and frozen foods:				
1958	847	1,283	2,073	428
1963	924	1,990	2,093	496
1967	939	2,636	1,772	606
Grain mill products:				
1958	288	945	817	112
1963	316	1,181	649	106
1967	315	1,537	532	118
Bakery products:				
1958	1,346	1,838	4,973	796
1963	1,228	2,307	4,138	724
1967	1,054	2,731	3,336	764
Sugar:				
1958	101	322	43	15
1963	124	549	40	42
1967	128	610	54	43
Confectionery and related products:				
1958	231	539	1,213	210
1963	250	723	1,013	233
1967	272	1,010	968	238
Fats and oils:				
1958	280	400	202	67
1963	266	478	186	82
1967	259	646	149	67
Miscellaneous foods:				
1958	414	423	2,107	249
1963	428	683	1,983	263
1967	480	950	1,807	277

Source: Bureau of the Census, Census of Manufactures, U.S. Dept. Commerce.

Table 5.--Value of shipments accounted for by the four, eight, and 20 largest companies in food manufacturing industries, 1963 and 1967

Industry	Value of shipments accounted for by-- 1/					
	4 largest companies		8 largest companies		20 largest companies	
	1963	1967	1963	1967	1963	1967
	Percent					
Meatpacking 2/	31	26	42	38	54	50
Sausages and other prepared meats 2/	16	15	23	22	35	34
Poultry dressing	14	15	20	23	30	35
Creamery butter	11	15	19	22	31	36
Cheese	44	44	51	51	59	61
Concentrated milk	40	41	53	56	71	74
Ice cream and frozen desserts ...	37	33	48	43	64	60
Fluid milk	23	22	30	30	40	42
Canned specialties 3/	67	69	83	83	94	94
Canned fruits and vegetables 3/ ..	24	22	34	34	50	52
Dehydrated foods	37	32	56	50	80	75
Pickles, sauces, and salad dressing 3/	36	33	46	44	64	62
Frozen fruits and vegetables 3/ ..	24	24	37	36	54	55
Flour and other grain mill products	35	30	50	46	71	70
Cereal preparations	86	88	96	97	99	99
Rice milling	44	46	66	68	86	89
Blended and prepared flour	70	68	82	82	92	93
Wet-corn milling	71	68	93	89	99	99
Bread, cake, and related products	23	26	35	38	45	47
Cookies and crackers	59	59	68	70	80	82
Raw cane sugar	47	43	65	65	82	82
Cane sugar refining	63	59	83	82	100	99
Beet sugar	66	66	97	96	100	100
Confectionery products	15	25	25	35	45	52
Cottonseed oil	41	42	56	60	72	80
Soybean oil	50	55	70	76	88	94
Vegetable oil	58	56	83	78	99	99
Shortening and cooking oils	42	43	64	67	92	93
Macaroni and spaghetti	31	31	47	48	71	73
Other food preparations	24	24	33	35	48	51

1/ Percentages consist of the sum of value of shipments of largest four, eight, or 20 companies divided by total value of industry shipments. A company is defined as all establishments under one ownership within an industry. Consequently, the same company may appear in several industries, if it has diversified activities. 2/ Percentages are based on value added by manufacture because value of shipments contains a substantial and unmeasurable amount of duplication. 3/ Percentages computed on value of production.

Source: Bureau of the Census, Concentration Ratios in Manufacturing, Special Report MC 67 (S)-2.1, Census of Manufactures, 1967, U.S. Dept. Commerce.

Four-firm concentration in food manufacturing did not change appreciably between 1963 and 1967, the latest period for which comparable data are available for all industries. Proportion of total shipments made by the four largest firms increased in each of 11 industries, stayed the same in six, and decreased in 13. Changes were slightly larger among industries that declined in concentration. Changes amounted to 3 or more percentage points in eight of the industries where concentration fell and in four where it rose. The greatest increase was in the confectionery products industry; concentration of the four largest firms went from 15 to 25 percent. The next largest increase was in the soybean oil milling industry, from 50 to 55 percent. Concentration in three industries--meatpacking, dehydrated foods, and flour milling--declined 5 percentage points.

Concentration percentages at the 20-firm level increased in 17 of the 30 food manufacturing industries between 1963 and 1967, stayed the same in six, and declined in seven. Thus, the fifth through 20th largest firms have grown relatively faster than the four largest firms. In 1967, the 20 largest firms accounted for 50 percent or more of value of shipments in 25 of the 30 food manufacturing industries.

LIVESTOCK AND MEAT

Livestock marketing encompasses the host of activities and institutions associated with coordinating supply of and demand for livestock. Participants in livestock supply are farmers, ranchers, and feeders who produce and offer livestock for sale. Participants in livestock and meat demand, in addition to consumers, are meat packers and processors, feeders, and ranchers who offer to buy livestock for their slaughter and processing plants, feedlots, and stock herds.

Marketing Channels

Channels through which livestock move to market have changed since 1960 (table 6). Packers have shifted away from terminal markets for their livestock purchases to more direct buying. Between 1960 and 1970, proportion of cattle purchased by packers at terminal markets declined from 46 percent to 19 percent, while direct purchases increased from 39 percent to 65 percent. The remaining 15-16 percent were purchased at auction markets.

In 1970, packers bought less than a fifth of their calves, hogs, and sheep at terminal markets. Auction markets were the source of more than half the calves purchased by packers, up from a third in 1960. More than two-thirds of the hogs and sheep were bought directly or through country dealers in 1970, up slightly from 1960. Proportion of livestock purchased by packers through auctions has remained fairly constant the last 5 years.

With improved roads and truck transportation, packers moved their plants away from terminal markets and closer to production areas, accounting, in part, for the rise in direct purchases by packers. Increasingly, the supply of cattle from the major production areas is coming from large feedlots. A

Table 6.--Packers' livestock purchases, by market outlet, 1960, 1965, and 1970 1/

Market outlet and year	Cattle		Calves		Hogs		Sheep	
	1,000 head	Percent	1,000 head	Percent	1,000 head	Percent	1,000 head	Percent
Direct, country dealers and others:								
1960	8,420	39	2,572	43	47,104	61	7,654	54
1965	13,455	45	2,351	34	46,613	63	8,127	62
1970	21,014	65	1,332	34	55,398	69	6,986	73
Terminal markets:								
1960	9,987	46	1,538	25	23,356	30	5,020	35
1965	10,162	34	1,127	17	17,375	23	3,321	26
1970	5,919	19	449	11	13,863	17	1,453	15
Auction markets:								
1960	3,399	15	1,940	32	6,695	9	1,493	11
1965	6,235	21	3,373	49	10,151	14	1,571	12
1970	5,265	16	2,139	55	11,586	14	1,192	12
Total:								
1960	21,806	100	6,050	100	77,155	100	14,167	100
1965	29,852	100	6,851	100	74,139	100	13,019	100
1970	32,198	100	3,920	100	80,846	100	9,631	100

1/ Packers and Stockyards Admin., U.S. Dept. Agr., Packers and Stockyards Resumes. Includes data for all firms purchasing more than 1,000 head of cattle or 2,000 head of all livestock during reporting period.

few feedlot operators have integrated forward into the meatpacking business to provide a direct outlet for their slaughter cattle. In 22 major cattle feeding States, number of feedlots with capacity of 1,000 head or more increased 32 percent between 1965 and 1970, while cattle marketed by these lots went up 80 percent. During 1965-70, number of cattle marketed through feedlots rose from 58 percent to 71 percent of U.S. commercial slaughter.

The basis of sale as livestock move through marketing channels has also changed. Cattle purchased by packers based on carcass grade and weight increased from 5 percent in 1961 to nearly 20 percent in 1969. Purchases of calves based on carcass grade and weight were 3.9 percent in 1969; for hogs, 4.3 percent. Purchases of sheep and lambs combined based on carcass grade and weight remained around 6 percent between 1961 and 1969.

Slaughtering Plants

Number of federally and nonfederally inspected slaughter plants in the United States totaled 7,714 in 1970, down 20 percent from 1960 (table 7). The increase in federally inspected and medium-sized nonfederally inspected plants was more than offset by decreases in large and small nonfederally inspected plants.

Table 7.--Federally and nonfederally inspected commercial slaughter plants, 1960, 1965, and 1970

Item	1960		1965		1970	
	Number	Percent	Number	Percent	Number	Percent
Federally inspected	530	5.5	570	7.4	725	9.4
Nonfederally inspected:						
Large <u>1</u> /	902	9.4	849	11.0	562	7.3
Medium-sized <u>2</u> /	1,712	17.7	1,538	20.0	2,582	33.5
Small <u>3</u> /	6,500	67.4	4,750	61.6	3,845	49.8
Total	9,114	94.5	7,137	92.6	6,989	90.6
All plants	9,644	100.0	7,707	100.0	7,714	100.0

1/ Plants slaughtering more than 2 million pounds live weight annually.

2/ Plants slaughtering between 300,000 and 2 million pounds live weight annually.

3/ Plants slaughtering less than 300,000 pounds live weight annually.

Source: Number of Livestock Slaughter Plants, Statis. Rptg. Serv., U.S. Dept. Agr., SRS-8 and SRS-8(Rev).

From 1960 to 1965, number of small nonfederally inspected plants (annual live weight slaughter of less than 300,000 pounds) declined 27 percent. This drop was associated with the decline in rural farm and nonfarm population, since most of these plants were located in small rural towns. Medium-sized and large nonfederally inspected plants also decreased between 1960 and 1965, but changes were minor relative to those in small plants. Number of federally inspected plants increased during this period.

Between 1965 and 1970, federally inspected plants rose 21 percent and medium-sized nonfederally inspected plants went up 68 percent. Number of large and small nonfederally inspected plants fell considerably during this 5-year period.

The Wholesome Meat Act of 1967 caused a decrease in small nonfederally inspected plants and an increase in federally inspected and medium-sized nonfederally inspected plants. The 1967 act required all State meat inspection programs to meet or exceed Federal standards. However, some States did not change their meat inspection programs to conform to the new law. As a result, some nonfederally inspected plants came under the Federal inspection program. The Wholesome Meat Act standards, as adopted by the remaining States, have caused some small nonfederally inspected plants to respond by increasing their volume to offset improvement costs that had been necessary to meet new requirements or by ceasing to operate.

Other factors contributed to changes in classification and size of plant. Several large firms closed plants that performed both slaughtering and processing activities and were located in metropolitan areas. New facilities were established; plants slaughtering livestock were put in areas of livestock production, while specialized processing plants were located near centers of population. Other firms also relocated slaughter facilities near livestock sources, processing plants near consumer centers, or both, to reduce transportation costs on live animals. The resulting increase in interstate meat shipments required many more plants to become federally inspected.

Number of federally inspected slaughter plants has been less than 10 percent of commercial slaughtering plants in the last decade, including a 37-percent increase in plant numbers since 1960. Small nonfederally inspected plants have accounted for at least 50 percent of slaughter plants during this period. Large and medium-sized nonfederally inspected plants accounted for 27 to 41 percent of the total during the decade (table 7). Commercial livestock slaughtering plants, excluding small nonfederally inspected plants, totaled 3,869 in 1970, 23 percent more than in 1960.

Distribution of total commercial livestock slaughter among various types and sizes of plants differs from distribution of plants. In 1969, the 725 federally inspected plants accounted for 89 percent of total commercial slaughter (live weight). These plants slaughtered 88 percent of the cattle, 74 percent of the calves, 95 percent of the sheep and lambs, and 91 percent of the hogs. Slaughter in the large and medium-sized nonfederally inspected plants accounted for 10 percent of commercial slaughter. Small nonfederally inspected plants, although most numerous, accounted for only 1 percent of total commercial slaughter. Thus, the 3,869 large and medium-sized nonfederally inspected plants and the federally inspected plants accounted for 99 percent of commercial slaughter (live weight) in 1969.

Regional distribution of plants, excluding small nonfederally inspected plants, has altered considerably during the past two decades (table 8). Most of the change has occurred since 1960, and can be attributed to the 48-percent increase in federally and medium-sized nonfederally inspected plants (table 7). Number of plants increased in five of six regions in the country. The change in plant distribution is associated with plants locating near major livestock producing areas. This factor caused the largest increases to occur in the East and West North Central regions, the major beef and pork producing areas. Plants nearly tripled in the West North Central Region (Minnesota, Iowa, Missouri, North and South Dakota, Nebraska, and Kansas).

As a result of these changes in regional growth rates, the North Atlantic Region accounted for only 11 percent of commercial slaughter plants in 1970, down from 19 percent in 1960. The West North Central Region had 23 percent of the plants in 1970, up from 10 percent in 1960. In 1970, almost half the 3,869 large and medium-sized nonfederally inspected plants and federally inspected plants were located in the two North Central regions compared with a third in 1960.

Concentration of federally inspected slaughter in a few large firms has decreased for all livestock species in the past two decades (table 9). In 1950, the four largest firms slaughtered 52 percent of the federally inspected cattle slaughter. By 1970, their share had dropped to 24 percent. Between 1950 and 1970, federally inspected slaughter by the fifth through 10th largest firms increased for all species except hogs. Sheep and lamb slaughter remained highly concentrated, with the 10 largest firms handling 76 percent of federally inspected slaughter in 1970. Between 1962 and 1970, the decline in concentration of slaughter by the four largest firms apparently leveled off for cattle and hogs, while concentration of slaughter in calves and sheep fluctuated considerably.

Medium-sized slaughter plants have increased in number, with a general movement of plants closer to production areas. As a result, plants have become more specialized. In the last 10 years, plants slaughtering only cattle and calves, hogs, or sheep and lambs have increased at a faster rate than multiple-species slaughter plants.

Meat Processing Plants

The federally inspected sector of the meat processing industry has grown markedly in both plants and production since 1954. Number of federally inspected plants processing meat food products nearly quadrupled from 905 in 1954 to 3,550 in 1971 (table 10). Most of the increase has occurred since 1963. Output of processed meat and meat food products, such as chili, frozen dinners, and pet foods, increased $3\frac{1}{2}$ times, from 14.8 billion pounds in 1954 to 53.0 billion pounds in 1971.

Some federally inspected processing plants also slaughter livestock but, based on changes in plant numbers, meat processing has become increasingly specialized. Between 1954 and 1971, number of federally inspected plants that only process increased 5 times, while the number that both process and slaughter livestock doubled. Most of the increase in specialization has occurred since 1963.

al slaughter plants, by region, selected years, 1950-70 1/

		1955		1960		1965		1970		
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	
ent		Number	Percent	Number	Percent	Number	Percent	Number	Percent	
North Atlantic (9 States)	744	23.9	619	19.3	599	19.0	516	17.5	442	11.4
East North Central (5 States)	800	24.7	774	24.1	722	23.0	657	22.2	925	23.9
West North Central (7 States)	313	9.7	290	9.0	312	9.9	368	12.4	890	23.0
South Atlantic (8 States)	370	11.4	445	13.8	418	13.3	383	13.0	426	11.0
South Central (8 States)	510	15.8	622	19.3	631	20.1	588	19.9	692	17.9
West (11 States)	471	14.5	467	14.5	462	14.7	445	15.0	494	12.8
Total (48 States)	3,238	100.0	3,217	100.0	3,144	100.0	2,957	100.0	3,869	100.0

1/ Includes all federally inspected plants and all plants not under Federal inspection with annual output of 300,000 pounds or more (live weight). These plants accounted for 99 percent of commercial slaughter (live weight) in 1969. Excludes small nonfederally inspected plants slaughtering less than 300,000 pounds (live weight) annually.

Source: Statis. Rptg. Serv. Number of Livestock Slaughter Plants, U.S. Dept. Agr., SRS-8 and SRS-8 (Rev.).

Table 9.--Total federally inspected slaughter accounted for by 10 largest firms, selected years, 1950-70

Species and rank of firm	1950 <u>1/</u>	1954 <u>1/</u>	1958 <u>1/</u>	1962 <u>1/</u>	1966 <u>2/</u>	1970 <u>2/</u>
	<u>Percent</u>					
Cattle:						
Largest 4 firms	51.5	45.2	35.7	29.5	27.7	24.2
5th through 10th	8.7	10.0	10.5	10.4	12.2	14.7
Largest 10	60.2	55.2	46.2	39.9	39.9	38.9
Calves:						
Largest 4 firms	58.0	59.3	49.7	39.9	45.6	32.0
5th through 10th	12.9	11.7	13.9	16.3	17.7	24.3
Largest 10	70.9	71.0	63.6	56.2	63.3	56.3
Sheep:						
Largest 4 firms	69.6	68.7	64.6	58.9	65.0	56.0
5th through 10th	15.9	16.1	17.2	17.1	20.0	20.3
Largest 10	85.5	84.8	81.6	76.0	85.0	76.3
Hogs:						
Largest 4 firms	48.5	48.4	41.3	39.0	39.1	34.6
5th through 10th	22.1	23.0	23.4	21.5	17.8	21.0
Largest 10	70.6	71.4	64.7	60.5	56.9	55.6

1/ Econ. Res. Serv. Decentralization in the Livestock Slaughter Industry. U.S. Dept. Agr., suppl. to Agr. Econ. Rpt. 83, Apr. 1966.

2/ Compiled from unpublished data, Packers and Stockyards Admin., U.S. Dept. Agr.

Table 10.--Federally inspected meat processing plants and production, selected years, 1954-71

Year	Plants			Production <u>1/</u> 1,000 pounds
	Total	Slaughter and process	Process only	
	<u>Number</u>	<u>Number</u>	<u>Number</u>	
1954	905	344	561	14,833,471
1958	1,190	411	779	16,791,997
1963	1,541	521	1,020	34,259,767
1967	1,914	549	1,365	38,238,329
1970 <u>2/</u> ...	3,213	603	2,610	45,289,066
1971 <u>2/</u> ...	3,550	674	2,876	52,989,241

1/ Represents pounds of inspected product reported in Annual Federal Meat and Poultry Inspection Statistical Summary, Consum. and Mktg. Serv., U.S. Dept. Agr. Some of the products may have been inspected more than once because they were subjected to more than one processing treatment, such as curing, smoking, and slicing. Figures include pet foods.

2/ Includes small number of State-inspected plants under supervision of Federal inspectors.

Source: Consum. and Mktg. Serv., unpublished data, U.S. Dept. Agr. Includes livestock and poultry slaughtering plants that process meat and meat food products.

Based on Bureau of the Census data, total number of companies and plants primarily engaged in manufacturing sausage and other prepared meats changed little between 1954 and 1967 (table 11). Large and medium-sized plants (over 20 employees) increased slightly between 1958 and 1967, while small plants declined, resulting in an increase in large and medium-sized plants as a proportion of total plants--from 33 percent to 41 percent. Value of shipments of the meat processing industry almost doubled between 1954 and 1967, bringing a substantial increase in average sales per plant. The percentage value of shipments accounted for by the four, eight, 20, and 50 largest meat processing companies remained constant between 1963 and 1967. The four largest firms accounted for 15 percent of value of shipments in 1967.

Wholesaling

Livestock

In the wholesale trade of livestock, establishments operated by brokers and agents accounted for four-fifths of total sales in 1967 (table 12). However, brokers and agents trading in livestock have declined about a fourth since 1958. Both number and average sales of livestock assemblers decreased between 1958 and 1967.

Table 11.--Meat products industries: Companies and establishments, value of shipments, and value added by manufacture, census years 1954-67

Year	Meatpacking	Sausage and other prepared meats	Poultry dressing
		<u>Number</u>	
Companies:			
1954	2,228	1,254	1,189
1958	2,646	1,430	1,095
1963	2,833	1,273	842
1967	2,529	1,294	709
Establishments:			
1954	2,367	1,316	1,309
1958	2,810	1,494	1,233
1963	2,992	1,341	967
1967	2,697	1,374	843
		<u>Million dollars</u>	
Value of shipments:			
1954	10,265	1,541	1,332
1958	11,972	2,066	1,888
1963	12,435	2,130	2,241
1967	15,576	3,008	2,936
Value added by manufacture:			
1954	1,397	334	207
1958	1,749	442	311
1963	1,908	563	411
1967	2,221	743	588

Source: Bur. of the Census, Census of Manufactures, Meat Products, SIC Codes 2011, 2013, 2015, U.S. Dept. Commerce.

Table 12.--Wholesale trade for meat and meat products and livestock:
Establishments, total sales, and sales per establishment, census
years 1954-67

Item	1967	1963	1958	1954
	<u>Establishments</u>			
	<u>Number</u>			
Meat and meat products:				
Merchant wholesalers	5,041	5,170	4,482	4,357
Agents and brokers	163	134	154	97
Manufacturers' sales offices and branches	616	577	522	665
Livestock:				
Merchant wholesalers	563	463	635	669
Agents and brokers	1,734	1,997	2,246	2,223
Assemblers of farm products ...	1,100	1,237	1,311	1,090
	<u>Total sales</u>			
	<u>Million dollars</u>			
Meat and meat products:				
Merchant wholesalers	7,395	5,371	3,891	2,866
Agents and brokers	853	810	609	521
Manufacturers' sales offices and branches	2,811	2,446	2,263	2,703
Livestock:				
Merchant wholesalers	836	639	759	888
Agents and brokers	9,531	8,811	8,936	7,558
Assemblers of farm products ...	1,586	1,396	2,123	1,771
	<u>Sales per establishment</u>			
	<u>1,000 dollars</u>			
Meat and meat products:				
Merchant wholesalers	1,467	1,039	868	658
Agents and brokers	5,233	6,048	3,954	5,367
Manufacturer's sales offices d branches	4,563	4,239	4,335	4,065
s	1,485	1,380	1,195	1,327
.....	5,497	4,412	3,979	3,400
's	1,442	1,129	1,619	1,625

. Census of Business--Wholesale Trade, U.S. Dept

Meat Products

Merchant wholesalers accounted for two-thirds of total sales of meat and meat products in 1967 compared with less than half in 1954. Sales per establishment of merchant wholesalers more than doubled between 1954 and 1967. Average sales of manufacturers' sales offices and branches remained fairly constant between 1954 and 1967, while average sales of agents and brokers fluctuated but were nearly the same in 1967 as in 1954. Number of establishments operated by agents and brokers increased sharply between 1954 and 1958, but changed little between 1958 and 1967. Certain meatpacking companies are wholesaling their fresh and processed meats through their own merchandising centers which have been set up in major metropolitan areas.

Prospects

Many of the factors producing changes in the livestock and meat industry have not run their course. As old slaughtering plants continue to depreciate and be replaced, the critical factors of livestock supplies and transportation costs in selecting plant sites probably will lead to choices of interior locations in most instances. Thus, the past pattern of relocation of slaughter plants likely will continue and direct purchases of livestock by packers will increase.

The share of federally inspected slaughter accounted for by the four largest firms will probably remain at present levels if their recent pattern of closing obsolete plants and acquiring single-plant firms continues. Also, present livestock slaughter capacity is sufficient. The decline in number of small nonfederally inspected slaughter plants will continue as the size of purchasing areas for federally inspected plants increases. The trend to larger feedlots will go on as long as additional economies of size are present.

Growth of the slaughter industry will partially depend on the amount of fabrication occurring at the meatpacking level. At present, meatpacking plants, chainstore central warehouses, and processors are doing some fabricating of cuts and evaluating the effect of this change on operations and costs.

Continued growth is likely in the meat processing industry because of increasing consumer demand for more convenient and highly prepared foods. Volume of meat going to hotels, restaurants, and institutions is increasing and these outlets also are purchasing more services. The upward trend in average plant sales will continue as more services are included in meat products, increasing value added of these foods.

DAIRY PRODUCTS

The dairy industry has been applying new technology almost as rapidly as such knowledge has emerged. Generally, new equipment and processes have contributed to structural adjustments, most often resulting in larger plants and organizations.

Two recent structural changes have altered the traditional relationships among sectors of the dairy industry. Producer cooperatives have grown from local to regional organizations. Concurrently, retail food chains have developed central procurement programs to obtain their packaged fluid milk products.

Producer Cooperatives

Cooperatives have effected a dramatic change in their relationships with producers and processors, and, perhaps most importantly, among themselves. The local producers' cooperative has become regional and national in its milk marketing principles.

New production, processing, and transportation technologies, economies of size, and the breakdown of intermarket barriers all have increased the mobility of milk supplies. Distributors service large marketing areas from a central plant.

Bargaining and functional effectiveness were both limited for local producer organizations. Producers' cooperatives found that they had to grow to properly service their members and the processors.

A number of Midwestern cooperatives formed two large bargaining federations in the early 1960's, and these initial federations have been followed by extensive mergers among cooperatives. Thus, truly regional cooperatives have developed throughout the Central and Southeastern United States. These mergers have probably set the pattern for continuing merger activity among cooperatives in the dairy industry.

Cooperatives have developed full-supply arrangements with many processors. Under full supply, the cooperative exercises complete responsibility for providing the processor with a flow of milk as needed. Procuring the fluctuating supply and coordinating it with a variable demand has been a high-cost operation. Variability of fluctuations, the risk factor and degree of uncertainty, and cost have been reduced by this cooperative action.

Farm quality control, intermarket transfer, and surplus management are being more effectively performed by these large cooperatives. Their size and method of coordinating these activities give flexibility of operation, while providing necessary stability for efficient milk production and marketing, especially in maintaining price relationships among markets. Approximately 72 percent of the Nation's milk supply is marketed through cooperatives. Both the number of cooperatives and producer membership have dropped to one-half the level 20 years ago. Though some of this attrition occurred because cooperatives went out of business, recent merger activity also has reduced their number.

These large cooperatives have consolidated much of their bargaining activity into big regional cooperatives and federations. Increased bargaining activities and shifting a major part of the responsibility for supply coordination from processors to cooperatives will continue to influence number, size, and competitive activities of processors of fluid and manufactured milk products.

Number of Plants

The most consistent structural change in the dairy industry has been the decline in plant numbers. A major influence has been the continuing shift in the economies of size curve. Small plants find themselves at an increasing cost disadvantage in processing milk compared with larger plants. As processing becomes more complex and equipment more costly, unit cost of processing small volumes becomes prohibitive.

In the 1900's and 1910's, introduction of many city ordinances requiring milk pasteurization resulted in relatively higher costs for small distributors compared with large ones, and many small distributors could no longer compete. In the 1920's and 1930's, introduction of classified pricing plans providing for uniform prices to producers by all handlers, both large and small, forced numerous small handlers to pay the same prices as their large competitors. Many of these small handlers found it impossible to do so and they, too, went out of business. In the late 1930's and 1940's, cost levels of smaller distributors were raised further by introduction of the paper carton. Since World War II, several technological and economic developments--none of them outstanding--have tilted the cost curves further.

Economies of size in plant operations are well demonstrated by the following tabulation (2, 3, 20):

Plant size (quarts per day):	Cost per quart
	<u>Cents</u>
6,000	6.7
20,000	4.5
50,000	3.7
100,000	3.4
200,000	2.8
400,000	2.6
800,000	2.4

Obviously, the smallest plants are severely disadvantaged and cannot compete unless they obtain access to specialized markets at higher than average prices or unless their owners are willing to accept substantially reduced returns for both investment and management. Middle-sized plants operate at some disadvantage.

Number of plants operated by local firms has declined most sharply. However, the trend has been downward for milk bottling plants under all types of ownership (table 13).

Fluid milk bottling plants in the United States fell 53 percent between 1948 and 1964. This decrease in 17 years was equaled by a 54-percent decline during the next 7 years--through 1971 (table 14).

Table 13.--Fluid milk bottling plants operated by various types of firms,
December 1964 and December 1970

Type of firm	December 1964	December 1970	Change, 1964-70
	<u>Number</u>	<u>Number</u>	<u>Percent</u>
National	280	205	-37
Regional	90	66	-27
Local:			
Multiunit	231	110	-52
Single-unit	3,209	1,658	-48
Cooperatives:			
Multiunit	115	95	-17
Single-unit	152	81	-47
Total	4,077	2,215	-46

Table 14.--Fluid milk bottling plants operated by commercial processors,
1948, and December 1964-71

Period	Regulated by Federal orders	Other	Total
	<u>Number</u>		
1948			8,484
1964	1,936	2,141	4,077
1965	1,782	1,939	3,721
1966	1,530	1,828	3,358
1967	1,456	1,503	2,959
1968	1,485	1,155	2,640
1969	1,478	980	2,458
1970	1,349	866	2,215
1971	1,136	728	1,864

While many small plants have gone out of business, remaining plants have grown larger. Fluid milk plants packaged an average of slightly more than 20 million pounds per plant in 1970, compared with less than 13 million pounds in 1963 and about 5.6 million in 1948.

From 1965 to 1970, number of plants selling less than 4 million pounds per month of packaged fluid milk decreased sharply. In contrast, a marked gain took place in plants packaging more than 4 million pounds (table 15).

Table 15.--Size distribution of fluid milk plants, comparable Federal orders and States, 1965 and 1970

Monthly sales volume of packaged fluid milk products: (1,000 pounds)	1965	1970	Change, 1965-70
	<u>Plants</u>		<u>Percent</u>
Less than 100	495	220	-56
100-499	855	444	-48
500-999	300	183	-39
1,000-1,999	266	205	-23
2,000-2,999	128	108	-16
3,000-3,999	102	82	-20
4,000-4,999	48	65	+35
5,000-9,999	120	138	+15
10,000-14,999	33	38	+15
15,000-19,999	12	18	+50
20,000-29,999	7	12	+71
Total	2,366	1,513	-36

Manufacturing plants increased the average volume of milk (milk equivalent basis) which they made into manufactured dairy products from 5.6 million pounds per plant in 1948 to 10 million in 1963 and about 17 million in 1970.

Though most of the impetus for larger plants undoubtedly comes from economies of size in processing, institutional factors also exert a strong influence. Under full-supply arrangements, cooperatives pick up milk from farmers, deliver it to plants according to a specified time and volume schedule, and have complete responsibility for filling shortages or processing surplus into manufactured products. This shift in procurement practices has enabled fluid milk processors to close many small country plants which they had maintained as a source of fluid milk and a means of handling their surplus. This change has contributed to overall efficiency in supplying the fluid milk market and in manufacturing dairy products (9).

Number of plants manufacturing dairy products also has been declining, but at a slower rate than that of fluid milk plants. Manufacturing plants dropped 37 percent between 1944 and 1961 and 42 percent from 1961 to 1970 (table 16).

Smaller volume plants have accounted for most of the decline in numbers both in fluid milk plants and manufacturing plants (table 17 and fig. 1). The decline has been dramatic for plants with fewer than 20 employees, while the number of plants with more than 100 employees has remained almost steady.

Larger plants naturally have a greater than proportionate share of employees, value added, and value of shipments in the industry (fig. 2 and table 18). However, considering economies of size, their proportion of new capital expenditures appears more than adequate to maintain the greater share. Thus, the shift toward larger plants should continue or accelerate.

Distribution

The fluid milk market, which began as a home-delivery operation, has now moved to the supermarket (fig. 3). Increasing delivery costs, especially for servicing small accounts, combined with economies of mass merchandising and new shopping habits by consumers to bring about this shift.

The switch from home delivery to large-volume wholesale deliveries has put the small processing plant at a great disadvantage. Processors outside the immediate area can service large supermarket accounts, whereas they would not find it practical to service home-delivery accounts. Many of these smaller plants have discontinued processing and become distributors for other fluid milk processors. In some cases, a number of small distributors have joined together to establish a jointly held bottling plant, while maintaining their separate identities as distributors.

Supermarkets have not been the only outlets to gain a part of the volume formerly delivered to homes. Dairy stores, delicatessens, convenience stores, and other types of foodstores account for about a fifth of sales; restaurants, hotels, institutions, schools, military establishments, and vending machines, another fifth (table 19).

Integration by Supermarkets

In the 1930's, two large national grocery chains built their own milk bottling plants to serve some of their stores. After World War II, they added more plants in other areas. In the last few years, they have been supplying a high proportion of their stores with milk from their own plants. In the postwar period--primarily in the late 1950's and the 1960's--other chains and a few cooperative and voluntary groups built or purchased milk plants.

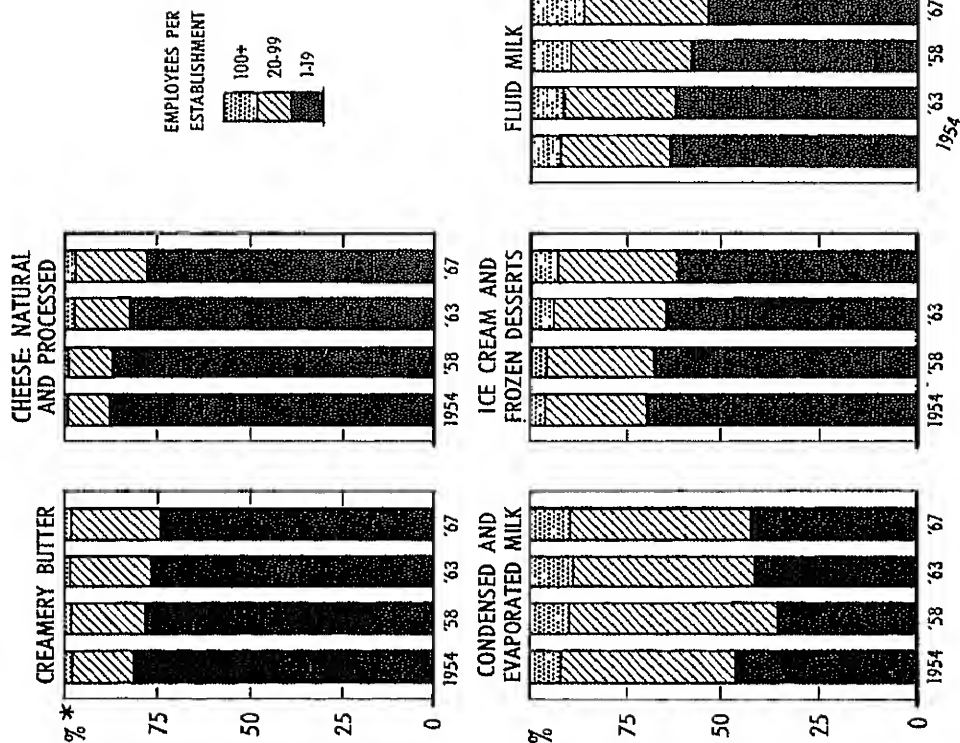
Table 17.--Dairy product establishments, by number of employees, census year 1954-67

Industry and year	Total establishments:	Proportion of total establishments with--		
		1-19 employees	20-99 employees	100 or more employees
	<u>Number</u>	<u>Percent</u>		
Creamery butter:				
1954	1,262	80.4	17.1	2.5
1958	1,058	78.4	19.2	2.4
1963	766	76.7	21.7	1.6
1967	540	74.4	23.9	1.7
Natural and processed cheese:				
1954	1,419	87.2	12.4	.4
1958	1,203	86.7	12.4	.9
1963	1,138	81.9	15.6	2.5
1967	1,026	76.8	20.1	3.1
Condensed and evaporated milk:				
1954	359	46.5	45.4	8.1
1958	313	35.5	54.6	9.9
1963	281	40.9	48.1	11.0
1967	291	41.9	47.4	10.7
Ice cream and frozen desserts:				
1954	1,587	70.0	26.3	3.7
1958	1,382	67.2	28.5	4.3
1963	1,081	64.2	29.6	6.2
1967	850	61.8	30.7	7.5
Subtotal, sum of four industries:				
1954	4,627	76.3	21.0	2.7
1958	3,956	73.6	23.2	3.2
1963	3,266	71.3	24.5	4.2
1967	2,707	67.9	27.1	5.0
Fluid milk:				
1958	5,817	61.6	29.6	8.8
1963	4,619	57.8	31.4	10.8
1967	3,481	53.0	32.9	14.1

Source: Bur. of the Census, Census of Manufactures, U.S. Dept. Commerce,

DAIRY PRODUCT INDUSTRIES

Establishments by Number of Employees

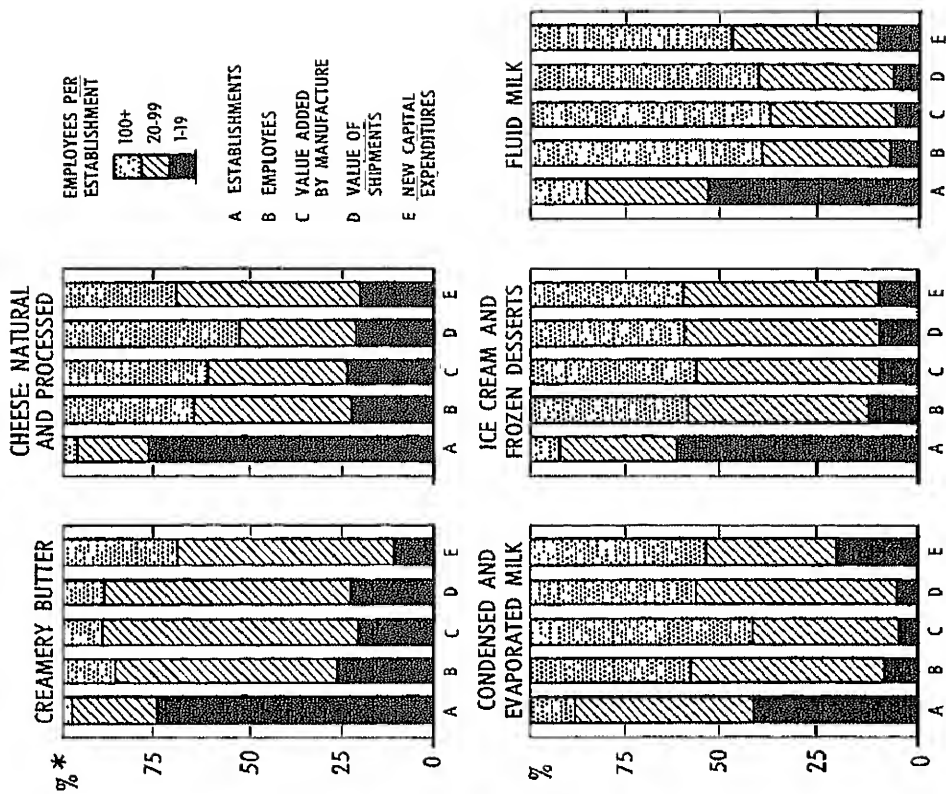


* OF INDUSTRY ESTABLISHMENTS. SOURCE: BUREAU OF THE CENSUS, CENSUS OF MANUFACTURES U.S. DEPARTMENT OF COMMERCE.

Figure 1

DAIRY PRODUCT INDUSTRIES

Selected Characteristics by Number of Employees, 1967



* OF TOTAL INDUSTRY. SOURCE: BUREAU OF THE CENSUS, 1967 CENSUS OF MANUFACTURES, U.S. DEPARTMENT OF COMMERCE.

Figure 2

Table 18.--Dairy product industries: Establishments, employees, value added by manufacture, value of shipments, and new capital expenditures, by employee size of establishment, 1967

Industry and size of establishment	: Estab- lishments:	Employees	: Value added by :		: Value of :		New capital
			1,000	Percent	manufacture l/ Mil.	shipments l/ Mil.		expenditures l/ Mil.
	Number	1,000	Percent	dol.	Percent	dol.	Percent
Creamery butter:							
Total establishments	540	8.7	100.0	113.2	100.0	958.8	100.0
1-19 employees	402	2.3	26.4	24.2	21.4	212.1	11.6
20-99 employees	129	5.2	59.8	77.8	68.7	646.0	56.8
100 or more employees ..	9	1.2	13.8	11.2	9.9	100.6	31.6
Cheese, natural and							
processed:							
Total establishments	1,026	20.0	100.0	226.5	100.0	1,707.8	100.0
1-19 employees	788	4.5	22.4	52.9	23.3	326.8	19.1
20-99 employees	206	8.4	41.8	84.5	37.3	560.5	32.8
100 or more employees ..	32	7.2	35.8	89.2	39.4	820.7	48.1
Condensed and evaporated							
milk:							
Total establishments	291	13.2	100.0	373.1	100.0	1,263.0	100.0
1-19 employees	122	1.0	7.6	15.6	4.2	60.2	2/19.8
20-99 employees	138	6.6	50.4	143.0	38.3	652.5	51.7
100 or more employees ...	31	5.5	42.0	214.5	57.5	550.3	43.6
Ice cream and frozen							
desserts:							
Total establishments	850	24.6	100.0	403.0	100.0	1,059.4	100.0
1-19 employees	525	3.1	12.6	40.2	10.0	105.5	10.5
20-99 employees	261	11.4	46.3	188.1	46.7	532.2	50.2
100 or more employees ...	64	10.1	41.1	174.6	43.3	421.8	39.8
Fluid milk:							
Total establishments	3,481	165.2	100.0	2,350.7	100.0	7,826.0	100.0
1-19 employees	1,845	11.3	6.8	141.0	6.0	525.8	6.7
20-99 employees	1,146	53.2	32.2	743.7	31.6	2,673.0	34.2
100 or more employees ...	490	100.9	61.0	1,466.1	62.4	4,627.2	59.1

1/ Sums may not equal totals because of rounding.

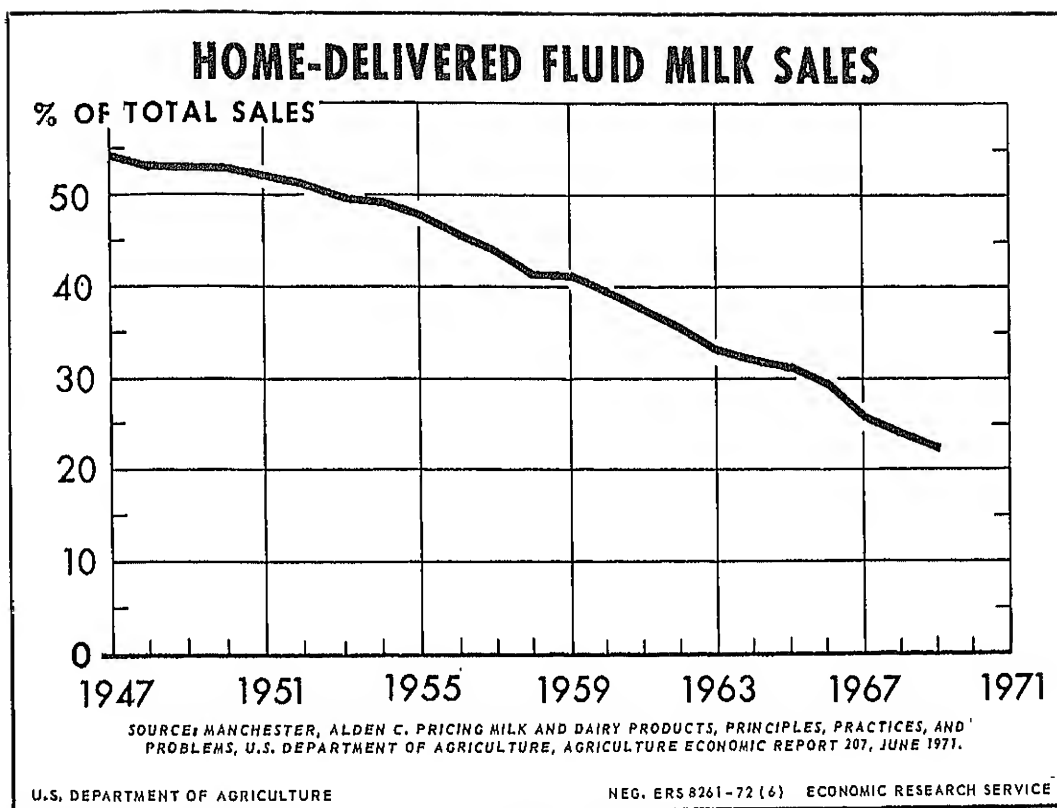


Figure 3

In 1965, 20 companies in the United States operated 36 plants which processed 3 percent of total volume (table 20). By 1967, this figure had increased to 5.1 percent and, by 1969, 23 companies operated 41 plants and accounted for 6.8 percent of total volume.

Some incentive for vertical integration by supermarket chains is provided by the existence of relatively high fixed margins under resale price control. Under such control, there has been considerable reluctance to permit quantity discounts and limited service delivery. In these circumstances, supermarket organizations have an incentive to build or acquire their own milk plants to capture available profits. In parts of the country where resale price control does not provide guaranteed margins, incentives are less clear cut. The argument has been given that a retail organization deals with a different labor organization than do processors and might be able to achieve economies of distribution which conventional milk processors could not. Generally, however, this argument does not seem to have held. Another possible incentive is that a retail organization operating its own milk plant can be fully assured of capturing all economies possible in a large-volume, limited service operation. Such economies might be prevented if price negotiation with processors were used, because of trade practice regulation activities of Federal and State agencies.

A broad range of forces can affect a food chain's decision to integrate backward in the marketing channel. These forces include: (1) relative cost of performing a set of functions under a vertically integrated system compared with cost under an open market price system; (2) forces that may influence

Table 19.--Fluid milk products, by type of outlet and distributor,
1969

Outlet	Volume accounted for by --			Total
	Commercial processor	Subdealer <u>1/</u>	Producer- distributor <u>2/</u>	
	<u>Percent</u>			
Home delivered	15.4	7.4	0.4	23.2
Plant and farm sales to consumers	3.0	--	.9	3.9
Stores:				
Supermarkets:				
Integrated	7.1	--	--	7.1
Other	21.6	.1	--	21.7
Dairy and convenience stores:				
Integrated	3.4	--	1.1	4.5
Other	5.2	.2	--	5.4
Other grocery stores and delicatessens	5.5	5.6	.3	11.4
Commissary stores	1.0	--	--	1.0
Nonfood stores .....	.7	<u>3/</u>	<u>3/</u>	.7
All stores	44.5	5.9	1.4	51.8
Institutional outlets:				
.....	2.3	--	--	2.3
.....	5.4	1.4	.3	7.1
Hotels, and				
.....	8.3	.9	.1	9.3
Institutional	16.0	2.3	.4	18.7
.....	1.8	.6	<u>3/</u>	2.4
.....	80.7	16.2	3.1	100.0

who operate no milk processing facility but purchase their
packaged milk.

primary supply of raw milk for processing from their own

5 percent.

Table 20.--Milk bottling plants operated by supermarket groups under Federal orders and other regulations, December 1965, 1967, and 1969 1/

Item	December		
	1965	1967	1969
	<u>Number</u>		
Plants:			
Federal orders	21	24	28
Other	15	16	13
Total	36	40	41
Companies	20	22	23
	<u>Million pounds</u>		
Volume:			
Federal orders	88.0	130.7	209.7
Other (estimated)	48.6	80.6	96.0
Total	136.6	211.3	305.7
	<u>Percent</u>		
Proportion of sales of commercial processors	3.0	5.1	6.8

1/ Most sales go through supermarket's stores. At least 5 other supermarket companies operate milk plants which supply other outlets beside their own stores; their volume is not included here but in table 19.

Source: Manchester, Alden C. Pricing Milk and Dairy Products, Principles, Practices, and Problems, Econ. Res. Serv. U.S. Dept. Agr., Rpt. 207, June 1971.

survival or growth of a firm; (3) forces that may have market power connotations; and (4) the legal and institutional environment--various laws, regulatory agencies, and bargaining groups.

The extent to which food chains have adopted centralized milk programs which represent various degrees of vertical coordination has been increasing. Developments that undoubtedly have resulted because of the forces encouraging backward vertical integration in fluid milk marketing channels by food chains are: (1) a general trend toward centralized buying and merchandising of fluid milk; (2) adoption of limited service delivery and performance of services in the marketing channel that traditionally were performed by fluid milk processors; (3) more emphasis on price competition at the fluid milk processor-food chain level of negotiations; (4) more attention to separating out the cost of fluid milk from the associated bundle of services at various stages in the channel; (5) initiation of private-label brands; and (6) full integration into fluid milk processing.

A somewhat different form of integration--or coordination--which supermarkets are practicing may have a greater impact on distribution. Food chains increasingly are negotiating terms of trade at their division or regional offices rather than at local stores. A study of the North Central Region found that about 80 percent of the supermarkets and 60 percent of the smaller stores served by 183 food distributors without their own milk plants were supplied milk on a centralized basis (6).

Supermarkets are limiting the brands of milk handled--often to their private label and the brand of the processor supplying the private label. The processor thus has an all-or-nothing bargaining situation. This result, together with the size of the account, has greatly increased the risk associated with servicing store accounts. To compete for supermarket accounts, the processor must be large enough to handle the total volume of business of a retail store division, which may involve several market centers. Since retail store divisions are often dispersed over large areas, other fairly large processors in the same vicinity could consequently lose their accounts. Even if such processors continue to compete, the advantage lies with multiunit processors who have plants covering the entire area served by retail store divisions.

From one point of view, a processor is not large enough to compete for supermarket chain or group accounts if he would be unable to withstand the financial shock of losing the account later. In general, medium-sized processors can exist primarily by serving the home-delivery market and non-supermarket portions of the wholesale market. These outlets are significant, however, and account for about 68 percent of all milk distributed.

Industry Concentration

Eight large dairy companies are important in the market for all types of dairy products. Several date back into the 19th century, but major growth of all eight has occurred since the turn of the century and of all but one, since

the mid-1920's. Much of the growth of these companies--like that of other industrial firms throughout the economy--occurred during two of the three merger movements in the United States.

The first wave of mergers around 1900 did not include significant activities in the dairy industry. The second merger movement--during the latter half of the 1920's--saw one dairy company with sales of over \$100 million in 1919 more than double its sales volume, primarily because of mergers within the industry. Another company was organized in 1923 and immediately began a period of rapid growth, primarily through mergers. By 1930, this dairy company had become the largest in the industry.

The 1950's brought the third major merger movement. As in many other industries, several companies in the dairy industry grew very rapidly, primarily by merger with other firms in the industry. By 1956, each of the eight national dairy companies had sales of over \$100 million, although not entirely of dairy products.

In 1934, the three largest dairy companies accounted for 22.8 percent of sales of packaged fluid milk and cream made by all commercial handlers (excluding producer-dealers). By 1950, their share had declined to 16.4 percent. Between 1950 and 1957, the share of these three companies increased modestly--from 16.4 to 18.8 percent. During the same period, the share of the fourth to eighth largest companies went from 4.3 to 8.3 percent.

Horizontal acquisitions made by dairy companies have slowed substantially since 1957, primarily because the FTC has challenged acquisition efforts of a number of the large companies under section 7 of the Clayton Act. The four largest fluid milk companies dropped from a 23-percent share in 1958 to 21 percent in 1967. This change was offset with an equal gain by the fifth to eighth largest; thus, the eight largest maintained their 29-percent share of the national market. The ninth through 20th largest companies also increased their share so that the top 20 companies moved from 37 percent in 1958 up to 40 percent in 1967 (table 21).

These large dairy companies, prevented from expanding their activities in the dairy industry, have been diversifying into a wider variety of product lines. Largely through mergers, they have moved into new lines inside and outside the food industry.

Despite the rapid decline in plant numbers, concentration in manufactured products has changed little at the manufacturing level in the past quarter century. Concentration of production in the butter industry dropped from 1947 to 1963, but rose during 1963-67. The percentage of total natural cheese production held by the four and eight largest companies fell between 1947 and 1954 but this share has risen since 1954. In 1958, the census classification was changed to include processed cheese with natural cheese. Volume of the four largest firms increased from 35 percent of industry shipments in 1958 to 45 percent in 1967. The fifth to eighth largest firms raised their share from 7 to 8 percent in the same time period; thus, the eight largest had 53 percent of industry shipments in 1967.

Table 21.--Concentration in dairy manufacturing and fluid milk industries,
census years 1947-67

Industry and year	Value of shipments accounted for by--		
	4 largest	8 largest	20 largest
	companies	companies	companies
	Percent		
Butter:			
1947	18	24	32
1954	14	19	28
1958	11	15	24
1963	8	14	25
1967	14	20	33
Cheese, natural and processed:			
1963	45	50	59
1967	45	53	62
Condensed and evaporated milk:			
1958	38	48	58
1963	33	42	55
1967	35	47	61
Ice cream and ices:			
1954	33	41	52
1958	35	44	54
1963	34	43	57
1967	32	42	57
Fluid milk and related products:			
1958	23	29	37
1963	22	29	38
1967	21	29	40

Source: Bur. of the Census, Census of Manufactures, 1967 Special Report
Series: Concentration Ratios in Manufacturing, Part 2: Product Class Con-
centration Ratios, U.S. Dept. Commerce, 1971.

POULTRY AND EGGS

The poultry and egg industries have been changing rapidly at all levels in the last two decades. Operating units have become fewer in number and larger because of substantial economies of size. Many units are now part of multipurpose firms. Since 1960, a growing share of total volume of poultry processed has been handled by such large, multipurpose firms. Motivation of firms to grow by acquisition and merger continued strong through 1970. However, some national and regional firms have dropped out of egg and poultry processing and related activities in recent years. If additional companies decide returns are inadequate, are forced to divest themselves of egg and poultry operations, or both, the trend toward concentration could be slowed or reversed.

The proportions of total output of eggs, chickens, and turkeys handled through traditional types of cooperatives have not changed much over the past decade. Percentages are now about 16 percent for market eggs, over 18 percent for turkeys, and less than 6 percent for chickens. New forms of cooperative organizations have emerged in both the egg and broiler industries in the last few years. These organizations operate on a national basis and are engaging in different types of activities, such as the gathering and exchange of market information and voluntary supply management programs.

Many firms are integrated all the way from production through marketing. Integrated operations have accounted for increasingly larger proportions of production and marketing of poultry and eggs over the past 15 years (table 22). These operations are most common in broilers, but are gaining in turkeys and market eggs. Eggs and poultry now typically move through shorter and more direct marketing channels. Increasingly, direct movement from packing plants to retailers is bypassing wholesale distributors (table 23). Substantial shifts in the geographic location of production have also occurred since the mid-1950's (15). The efficiency of poultry and egg marketing operations is demonstrated by the relative stability of farm to retail price spreads in contrast to those for many other commodities.

Egg Production and Marketing

Volume of eggs sold per farm increased fivefold from 1954 to 1964 and about doubled from 1964 to 1970. Size of egg producing units has increased tremendously and modern egg farms have become highly mechanized. Percentage of eggs of Grade A quality or better delivered by producers to packing plants has increased substantially over the past two decades; many producers now deliver close to 95 percent Grade A's.

Eggs are marketed in three major ways. First and most important are table eggs, marketed mainly in cartons through retail outlets and secondarily in 30-dozen cases in the institutional trade. Processed eggs are second. Most commonly, these eggs are dried, frozen, and broken out for use as liquid eggs. They may be processed whole or separated into various parts, such as egg yolks and whites. Flavorings such as salt or sugar may be added in

Table 22.--Changes in integration in poultry and egg industries,
selected years, 1955-70

Item and year	Output involved in--		
	Owner-integrated enterprises	Contract production	Contract marketing
	Percent		
Broilers:			
1955	2.0	87.0	1.0
1960	5.0	90.0	1.0
1965	5.5	90.0	1.5
1970	7.0	90.0	2.0
Turkeys:			
1955	4.0	21.0	11.0
1960	4.0	30.0	16.0
1965	8.0	35.0	13.0
1970	12.0	42.0	18.0
Market eggs:			
1955	1.5	.5	12.5
1960	5.5	7.0	13.5
1965	12.5	18.0	13.5
1970	20.0	20.0	15.0

Source: Poultry Group, unpublished estimates, Mktg. Econ. Div., Econ. Re
Serv., U.S. Dept. Agr.

Table 23.--Changes toward more direct marketing channels in poultry and
egg industries, selected years, 1955-70

Year	Movement from packing plants to retailers and institutions of--1/		
	Shell eggs	Ready-to-cook broilers	Ready-to-cook turkeys
	Percent		
1955	22.0	40.0	47.0
1960	26.0	50.5	57.0
1965	55.0	57.5	62.0
1970	77.5	75.0	72.0

1/ Movement to retailers includes that to warehouses and stores. Balance
movement not going direct to retailers and institutions moves through whole
salers and jobbers.

Source: Poultry Group, unpublished estimates, Mktg. Econ. Div., Econ. Re
Serv., U.S. Dept. Agr.

the processing. Processed eggs are used in many manufactured food products--noodles, cake mixes, scrambled-egg mixes, and baked goods. The third major use of eggs is in hatching involving about 6 percent of all eggs sold off-farm.

Number of Packing Plants

Accurate data are not available as to the number of egg packing plants in operation. However, statistics on large plants reporting to the Market News Branch, Poultry Division, Consumer and Marketing Service, U.S. Department of Agriculture, through the commercial egg movement report would indicate that egg packing plants are increasing in size. There were 689 plants in the sample in 1965, handling 1.3 million cases of eggs per week. In 1969, a somewhat smaller sample of 453 plants handled 1.6 million cases of eggs per week. Size and distribution of plants are shown in table 24. By 1971, plants reporting dropped to 401 but volume handled remained at 1.6 million cases per week. The trend toward fewer and larger egg packing plants is further substantiated by trade comments indicating a much more rapid decline in numbers of smaller plants.

It was estimated that plants in the sample accounted for 41 percent of U.S. eggs sold off-farm in 1969, 42 percent in 1967, and 39 percent in 1965.

Location of Packing Plants

Total number of egg packing plants in each geographic region of the United States is not known. However, in 1971, about 19 percent of respondents for the Commercial Egg Movements Report were located in the North Atlantic Region, 36 percent in the East and West North Central regions, 32 percent in the South Atlantic and South Central regions, and 13 percent in the Western Region.

Processing

Processed eggs accounted for 34 of the 319 consumed per person in 1970, and their proportion is likely to increase in the future. As mentioned, frozen, dried, and liquid are the three major forms. Frozen eggs account for over half the processed eggs. "In the fiscal year 1970, approximately 80 percent of total U.S. production of egg products were produced in about 100 Federally inspected plants. Volume of all inspected plants was about 608 million pounds" (10).

In 1968, "there were about 700 non-Federally inspected plants producing egg products. Total annual production from these plants totaled 213 million pounds. Over 600 of these plants were relatively small and produced only 37 million pounds or less than 5 percent of the 800 million pounds of egg products produced in the United States during that period" (10).

Table 24.--Egg packing plants: Location and distribution of volume handled, by size group, spring 1967, spring 1969 and spring 1971 ^{1/}

Year and region	Distribution of plants by size (cases per week) of--				Distribution of volume b plant size (cases per week) of--			
	400-	1,000-	4,000		400-	1,000-	4,000	
	999	3,999	or	Total	999	3,999	or	Total
	2/	:	more	:	2/	:	more	:
	Number				Percent			
1967:								
North Atlantic	21	48	17	86	7	42	51	10
East North Central	22	27	20	69	7	25	68	10
West North Central	25	58	12	95	9	57	34	10
South Atlantic	17	56	28	101	4	38	58	10
South Central	17	34	13	64	5	34	61	10
West	5	27	16	48	2	20	78	10
United States	107	250	106	463	5	36	59	10
1969:								
North Atlantic	15	44	20	79	5	39	56	10
East North Central	28	32	23	83	8	26	66	10
West North Central	25	57	10	92	8	63	29	10
South Atlantic	12	58	28	98	2	37	61	10
South Central	11	27	15	53	4	28	68	10
West	6	24	18	48	1	15	84	10
United States	97	242	114	453	4	32	64	10
1971:								
North Atlantic	13	41	22	76	17	54	29	10
East North Central	19	32	30	81	23	40	37	10
West North Central	13	38	13	64	20	60	20	10
South Atlantic	7	39	29	75	9	52	39	10
South Central	17	23	15	55	31	42	27	10
West	8	23	19	50	16	46	38	10
United States	77	196	128	401	19	49	32	10

^{1/} Based on a 5-week period consisting of April and the first week of May.

^{2/} May include a few plants handling less than 400 cases per week, although virtually all of these have been eliminated from the sample.

Source: Market News Br. Commercial Egg Movements Report, Consum. and Mktg. Serv., U.S. Dept. Agr.

Number and location of plants covered by Federal inspection indicates regional distribution (table 25). In 1970, 87 plants processed frozen eggs under Federal inspection, compared with 93 plants in 1969. In 1969, there were 49 plants in the Midwest and 24 in the South. In 1970, the Midwest had 46 plants and the South, 22.

There were 24 plants processing dried eggs under Federal inspection and grading programs during 1970; 19 were in the Midwest, three in the South, and two in the West. Although there has been a major movement southward by the table egg industry during the last two decades, most egg processing plants under Federal inspection are located in the Midwest.

Table 25.--Plants producing frozen and dried eggs under Federal inspection and grading programs, by region, 1960, 1965, 1967, 1969, and 1970

Region	Frozen eggs					Dried eggs				
	1960	1965	1967	1969	1970	1960	1965	1967	1969	1970
	----- Number -----									
Northeast:	2	2	4	8	7	0	0	0	0	0
South:	7	23	17	24	22	1	2	3	3	3
Midwest ..:	92	63	51	49	46	14	16	19	20	19
West	4	8	12	12	12	1	3	2	3	2
Total ..:	105	96	84	93	87	16	21	24	26	24

Source: Consum. and Mktg. Serv. Lists of plants operating under USDA poultry and grading programs, U.S. Dept. Agr.

Hatcheries

In the hatchery industry, there is also a trend toward fewer and larger units. Number of chicken hatcheries decreased nearly 50 percent from 1965 to 1971 (table 26). In 1965, the West North Central Region had 31 percent of these hatcheries--the greatest proportion--and the South Central Region had 19 percent. The largest incubator capacity was in the South Atlantic and South Central regions. By 1971, the share of chicken hatcheries in the West North Central Region had dropped to 25 percent. The South Central Region had almost the same proportion--23 percent. But nearly 70 percent of incubator egg capacity was located in the South Atlantic and South Central regions by January 1971. Twenty-eight percent of the hatcheries were in the largest size group in 1965. By 1971, 46 percent were in this group.

Turkey hatcheries followed the same growth pattern toward fewer and larger units. Total number decreased 44 percent between 1965 and 1971, while incubator egg capacity declined less than 4 percent (table 27).

Table 26.--Chicken hatcheries and eggs produced, by egg capacity and region,
January 1, 1965 and January 1, 1971

Year beginning January 1 and egg capacity	Region						
	North	East	West	South	South		United
	Atlantic	North	North	Atlantic	Central	West	<u>1/</u> States
	Central	Central	Central				
<hr/>							
	<hr/> Hatcheries <hr/>						
1965:							
Less than 60,000 ...	101	142	243	19	112	64	681
60,000-199,000	105	212	398	119	131	65	1,030
200,000-499,000 ...	42	47	64	108	102	39	402
500,000 and over ...	20	13	18	92	93	16	252
Total	268	414	723	338	438	184	2,365
1971:							
Less than 60,000 ...	46	47	93	9	38	20	253
60,000-199,000	44	85	153	28	63	29	402
200,000-499,000 ...	28	39	42	69	69	26	273
500,000 and over ...	22	10	9	108	113	19	281
Total	140	181	297	214	283	94	1,209
<hr/>							
	<hr/> 1,000 eggs <hr/>						
1965:							
Less than 60,000 ...	2,816	4,974	9,435	583	3,399	1,798	23,005
60,000-199,000	11,475	21,490	39,450	15,666	15,868	7,847	111,796
200,000-499,000 ...	12,726	13,584	18,240	35,787	33,888	11,632	125,857
500,000 and over ...	18,932	8,595	14,813	72,756	83,782	11,782	210,660
Total	45,949	48,643	81,938	124,792	136,937	33,059	471,318
1971:							
Less than 60,000 ...	1,233	1,725	3,602	237	1,241	567	8,605
60,000-199,000	5,122	9,006	15,826	3,520	7,785	3,742	45,001
200,000-499,000 ...	8,784	11,893	11,871	23,781	22,978	7,831	87,138
500,000 and over ...	23,178	7,037	8,644	126,480	122,377	16,876	304,592
Total	38,317	29,661	39,943	154,018	154,381	29,016	445,336

1/ Includes Hawaii.

Source: Statis. Rptg. Serv., Hatchery Production, U.S. Dept. Agr., Pou. 1.1 (11-65) Oct. 1965; Eggs, Chickens and Turkeys, Mar. 1971.

Table 27.--Turkey hatcheries and eggs produced by egg capacity and region, January 1, 1965 and January 1, 1971

Year beginning January 1 and egg capacity	Region						United States
	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West 1/	
<u>Hatcheries</u>							
1965:							
Less than 25,000	41	15	24	7	8	23	118
25,000-59,000	16	18	30	5	11	22	102
60,000-99,000	2/15	8	24	10	8	15	2/80
100,000-199,000	--	11	27	9	17	15	79
200,000 or more	--	10	18	12	9	25	74
Total	72	62	123	43	53	100	453
1971:							
Less than 25,000	16	7	3/	4	15	5/	42
25,000-59,000	8	22	3/	--	14	5/	44
60,000-99,000	2/8	4	3/	4/6	4	5/	22
100,000-199,000	--	19	3/	8	33	5/	60
200,000 or more	--	38	3/	15	31	5/	84
Total	32	90	3/	33	97	5/	252
<u>1,000 eggs</u>							
1965:							
Less than 25,000	406	218	284	103	105	340	1,456
25,000-59,000	557	703	1,228	208	406	869	3,962
60,000-99,000	2/1,496	573	2,143	788	619	1,195	2/6,814
100,000-199,000	--	1,439	4,113	1,267	2,207	1,985	11,011
200,000 or more	--	3,281	6,891	5,235	2,875	9,560	27,842
Total	2,459	6,214	14,659	7,601	6,212	13,940	51,085
1971:							
Less than 25,000	167	81	3/	55	194	5/	497
25,000-59,000	282	835	3/	--	538	5/	1,700
60,000-99,000	2/1,049	327	3/	4/390	273	5/	1,099
100,000-199,000	--	2,812	3/	1,105	5,680	5/	10,027
200,000 or more	--	16,387	3/	6,135	12,953	5/	35,940
Total	1,498	20,442	3/	7,685	19,638	5/	49,263

1/ Does not include Alaska and Hawaii.

2/ Hatcheries in North Atlantic Region with 100,000 or more capacity included to avoid disclosing individual operations.

3/ East North Central and West North Central regions combined to avoid disclosing individual operations.

4/ Hatcheries in South Atlantic Region with 25,000-59,000 capacity included to avoid disclosing individual operations.

5/ South Central Region and West combined to avoid disclosing individual operations.

Source: Statis. Rptg. Serv., Hatchery Production, U.S. Dept. Agr., Pou. 1.1 (11-65) Oct. 1965; Eggs, Chickens and Turkeys, Mar. 1971.

Poultry Processors

Number and Size of Plants

While total output has been increasing, number of slaughtering and eviscerating plants has been declining. Plants under Federal inspection fell about 15 percent between 1964 and 1970, while output rose almost 45 percent (table 28). Although total number of these plants declined, large plants annually processing 30 million or more pounds of poultry about doubled and in 1970 represented almost half of all Federally inspected plants.

Volume of poultry slaughtered in plants with annual volume of less than 10 million pounds fell from 7 percent of the total in 1964 to 2½ percent in 1970. In contrast, the proportion of total output slaughtered by large plant increased from 57 percent in 1964 to 78 percent in 1970. Average volume of poultry slaughtered per plant was 31 million pounds in 1970, compared with 18 million pounds in 1964.

Table 28.--Poultry plants under Federal inspection and volume slaughtered, by size group, 1964 and 1970

Item	Plants		Volume slaughtered	
	1964	1970	1964	1970
	<u>Percent</u>			
<u>Million pounds:</u>				
Under 1,000 ..	15.1	9.7	0.1	0.1
1,000-4,999 ..	15.5	6.8	2.2	0.5
5,000-9,999 ..	11.5	7.5	4.9	1.9
10,000-29,999 :	35.7	31.6	36.0	19.7
30,000 or more:	22.2	44.4	56.8	77.8
	<u>Number</u>			
Total plants :	482	412		
	<u>Million pounds</u>			
Total volume :				
slaughtered :			8,944	12,954

Source: Poultry Div. Records, Consum. and Mktg. Serv., U.S. Dept. Agr.

Industry Concentration

From 1960 to 1964, the four largest firms slaughtering young chickens under Federal inspection increased their share of total federally inspected slaughter from 12 to 18 percent, but no change occurred between 1964 and 1968 (table 29). The 20 largest firms brought their share of total federally inspected slaughter from 32 percent in 1960 to nearly half in 1968. Number of plants operated by the four, eight, and 20 largest firms also increased during this period.

The four largest firms slaughtering turkeys under Federal inspection increased their share of total slaughter from 22 percent in 1960 and 1964 to 30 percent in 1968. The 20 largest firms slaughtered about half the volume in 1960 and nearly two-thirds in 1968. However, number of plants operated by these firms declined slightly during 1960-68.

Further information about concentration is shown in table 30. Number of firms accounting for 90 percent of the volume of young chickens slaughtered declined from 175 in 1960 to 90 in 1968. Similarly, number of firms representing 90 percent of turkey slaughter dropped from 87 to 43.

Plant Location

Slightly over half of all poultry slaughtering and eviscerating plants under Federal inspection are located in the South Central and Atlantic regions of the country. Number of poultry plants has decreased in all regions except the South Central (table 31). Volume of poultry rose in every region between 1964-70, with the largest increase occurring in the two southern regions. Three-fourths of total output was concentrated in these two southern regions in 1970, up from 70 percent in 1964.

Further Processing

Many further-processors start with ready-to-cook birds, cook and usually debone the meat, and prepare a large variety of canned, frozen, and dried products--such as chicken soup, chicken and turkey pies, and many other items. Others buy deboned poultry meat.

In 1970, the proportion of meat from young chickens used in further processing was less than 3½ percent. In contrast, almost half the meat from nature chickens and almost one-fourth of turkey poundage was further processed.

Number of further-processing plants under Federal inspection increased from 444 in 1964 to 635 in 1970 (table 32). Although number of plants increased, larger plants attained a bigger share of the volume. In 1964, the 36 largest plants accounted for 70 percent of total output. In 1970, 71 plants were processing 5 million pounds or more annually and accounted for 79 percent of total output. Small plants represented about two-thirds of all plants in 1970, but comprised only 2.9 percent of total output.

Table 29.--Federally inspected young chickens and turkeys slaughtered by the four, eight, and 20 largest firms and plants operated by these firms, 1960, 1964, and 1968 1/

Poultry and year	Federally inspected slaughter by --		
	4 largest firms	8 largest firms	20 largest firms
	<u>Percent</u>		
Young chickens:			
1960	12	18	32
1964	18	28	44
1968	18	29	47
Turkeys:			
1960	22	32	50
1964	22	33	51
1968	30	44	65
	<u>Plants operated by --</u>		
	4 largest firms	8 largest firms	20 largest firms
	<u>Number</u>		
Young chickens:			
1960	21	31	52
1964	36	51	80
1968	31	48	84
Turkeys:			
1960	34	41	60
1964	29	37	56
1968	30	38	54

1/ Production for plants processing at least 1,000 young chickens or turkeys annually.

Source: Econ. Res. Serv., Changes in Firm and Plant Size in Broiler and Turkey Processing, U.S. Dept. Agr., PES-259, Nov. 1969.

Table 30.--Federally inspected young chicken and turkey processing firms accounting for specified proportions of output, 1960, 1964, and 1968 ^{1/}

Percentage of output	Young chickens			Turkeys		
	1960	1964	1968	1960	1964	1968
	----- Number -----					
30	19	9	8	6	6	4
50	47	26	22	18	17	10
70	94	55	48	40	35	21
80	125	77	66	57	48	30
90	175	107	90	87	69	43
95	228	131	108	121	93	53
100	286	201	153	249	189	102

^{1/} Production is from plants processing at least 1,000 young chickens or turkeys annually; at least two-thirds of all poultry processed in such plants were young chickens or turkeys.

Source: Econ. Res. Serv. Changes in Firm and Plant Size in Broiler and Turkey Processing. U.S. Dept. Agr., PES-259, Nov. 1969.

More than one-fourth of the plants engaged in further processing of poultry were located in the North Atlantic Region in 1970 (table 33). These plants, however, processed only 14 percent of the volume. The West North Central Region had only 11½ percent of the plants in 1970, but processed 31 percent of the volume. Plants in the two southern regions nearly doubled between 1964 and 1970 and their proportion of industry output rose from 29½ percent to almost 37 percent during the same period.

Poultry and Poultry Product Wholesalers

Number of firms assembling poultry and eggs at the farm level decreased nearly 50 percent between 1963 and 1967 (table 34). This decline results from more direct marketing of poultry and eggs. Wholesalers are being increasingly bypassed. Though wholesalers at other levels have increased slightly, volume per firm has not shown the rate of growth evident at the processing level.

New Product Developments and New Marketing Techniques

Producers and processors of poultry and eggs are constantly trying to develop new products and better ways to market existing items. One recent development in broiler marketing is an extensive network of fast food service

Table 31.--Poultry slaughtering plants under Federal inspection and annual volume of slaughter, by size of plant and region, 1964 and 1970

Year and region	Plant size (1,000 pounds slaughtered)										Pounds									
	Less than 1,500	1,500 to 5,200	5,200 to 15,600	15,600 or over	Total	Less than 1,500	1,500 to 5,199	5,199 to 15,599	15,599 or over	Total	Less than 1,500	1,500 to 5,199	5,199 to 15,599	15,599 or over	Total	Less than 1,500	1,500 to 5,199	5,199 to 15,599	15,599 or over	Total
1964:																				
North Atlantic	18	12	13	18	61	7,451	38,910	136,022	628,413	810,796										
East North Central	22	15	20	7	64	12,110	45,019	194,769	156,110	408,008										
West North Central	10	19	31	20	80	5,305	55,594	328,595	498,560	888,054										
South Atlantic	16	5	9	77	107	8,170	10,207	92,450	3,034,078	3,144,905										
South Central	11	7	18	82	118	5,670	19,839	197,300	2,861,298	3,084,107										
West	7	8	22	16	53	5,082	30,540	218,062	354,391	608,075										
Total	84	66	113	220	483	43,788	200,109	1,167,198	7,532,850	8,943,945										
1970:																				
North Atlantic	12	7	6	20	45	7,323	26,589	54,885	779,153	867,950										
East North Central	12	4	14	12	42	8,891	10,074	138,084	316,899	473,948										
West North Central	7	4	20	28	59	4,270	12,331	248,882	805,647	1,071,130										
South Atlantic	1/6	1/	6	88	100	1/5,694	1/	55,401	4,706,565	4,767,660										
South Central	7	3	9	102	121	3,630	9,028	92,228	4,846,705	4,951,591										
West	1/8	1/	16	21	45	1/8,363	1/	180,369	633,823	822,555										
Total	52	18	71	271	412	38,171	58,022	769,849	12,088,792	12,954,834										

1/ Plants and volume for less than 1,500 and 1,500-5,199 combined to avoid disclosure of individual plants.

Table 32.--Plants and volume of poultry used in further processing, by size of plant, 1964 and 1970

Annual volume used in further processing ^{1/}	Plants				Poultry used in further processing			
	1964	1970	1964	1970	1964	1970	1964	1970
	<u>Number</u>		<u>Percent</u>		<u>Million pounds</u>		<u>Percent</u>	
Less than 100	218	313	49.1	49.3	5.8	7.6	0.9	0.6
100-499	88	114	19.8	17.9	19.6	29.6	3.1	2.3
500-999	41	48	9.2	7.6	29.6	36.6	4.7	2.8
1,000-4,999 ..	61	89	13.8	14.0	132.4	198.8	21.0	15.4
5,000 or more	36	71	8.1	11.2	444.2	1,019.8	70.3	78.9
Total	444	635	100.0	100.0	631.6	1,292.4	100.0	100.0

^{1/} 1,000 pounds ready-to-cook weight.

Source: Poultry Div. Unpublished data, Consum. and Mktg. Serv., U.S. Dept. Agr.

outlets and carryout restaurants featuring fried chicken. In 1970, about 15 percent of the broiler volume was sold through these outlets. Another recent development is use of chicken meat in manufacture of products such as hotdogs. New egg products include a scrambled-egg mix, and various egg and fruit juice drink combinations.

Future Trends

Current trends in the poultry industry are expected to continue, resulting in fewer and larger operating units and increased integration in the industry. Contract production and owner-integration are expected to expand further in market eggs and turkeys. Further gains in marketing efficiency are likely.

Increased emphasis on consumer protection has resulted in better sanitation in poultry processing plants and uniform Federal-State inspection standards. Legislation bringing egg processing plants under Federal inspection as of July 1, 1971, is another step toward better quality product. Legislation also will result in uniform Federal-State grading by July 1, 1972.

Table 33.--Further-processors of poultry: Plants and volume of ready-to-cook poultry meat used, 1964 and 1970

Region	Plants				Volume			
	1964		1970		1964		1970	
	No.	Pct.	No.	Pct.	Mil. lbs.	Pct.	Mil. lbs.	Pct.
North Atlantic.....	113	25.5	163	25.6	81	12.9	177	13.7
East North Central ..	79	17.8	111	17.5	94	14.8	139	10.7
West North Central ..	73	16.4	73	11.5	211	33.4	396	30.6
South Atlantic	62	14.0	106	16.7	119	18.8	290	22.5
South Central	48	10.8	97	15.3	68	10.7	186	14.4
Western	69	15.5	85	13.4	59	9.4	104	8.1
Total	444	100.0	635	100.0	632	100.0	1,292	100.0

Source: Poultry Div. Unpublished data, Consum. and Mktg. Serv., U.S. Dept. Agr.

Table 34.--Wholesalers of poultry and poultry products: Establishments and sales, census years 1954-67

Item and year	Merchant wholesalers	Agents and brokers	Manufacturers' sales offices and branches	Assemblers of farm products
	Number			
Establishments:				
1954	2,660	<u>1</u> /	NA	<u>1</u> /
1958	2,082	168	52	1,724
1963	1,942	104	29	1,533
1967	2,022	101	33	784
Sales:				
1954	1,475	<u>1</u> /	NA	<u>1</u> /
1958	1,462	204	99	808
1963	1,628	313	58	764
1967	2,180	230	111	442

ts combined.

, Census of Business Wholesale Trade, U.S. Dept.

GRAINS USED FOR FOOD

Marketing grain for domestic food is often interrelated with merchandising grain for feed. Some industries in the food grain sector also export grain and grain products. Consequently, an evaluation of the structure, conduct, and performance of this sector is influenced by economic changes in the feed grain sector as well as those in the export market.

Movement of food grains from the farm to the consumer of bakery and cereal products and other grain products involves a number of marketing and distribution industries. Their structure has changed considerably in number and size of establishments, integration, and industry concentration. New technologies have made it possible for fewer and fewer elevators, millers, and bakers to handle domestic production. As a result, their numbers have declined significantly, and this trend is likely to continue.

Grain Elevators

Number of country elevators rose substantially from 1954 to 1963 but fell to the 1954 level in 1967 as shown below:

Year	Country elevators	Terminal elevators
	<u>Number</u>	
1954	6,580	460
1958	7,000	690
1963	7,653	633
1967	6,477	767

The change in country elevator numbers was related more to food and feed grain production than to domestic consumption of food grains. The earlier increase in elevators reflected a buildup of grain stocks, whereas the recent decline showed a depletion of these stocks. In contrast to country elevators, terminal elevators rose about 50 percent from 1954 to 1958, stabilized between 1958 and 1963, and had increased further by 1967. Growth in these elevators in 1963-67 probably reflects their increased relative efficiency compared with country elevators.

Grain Milling

Grain mill product industries manufacture whole grain into commodities such as flour, cereal, cake mixes, and sirup. Since each industry can be differentiated by type of grain, product produced, or both, their economic structure is discussed individually.

Flour and Meal

Plants producing flour and meal decreased a third from 1954 to 1967 (table 35). Wheat flour millers, which represent approximately half the establishments in the industry, had declines in plant numbers, as did commercial manufacturers and prepared-flour mix producers.

Per capita consumption of flour and meal products has either been declining or stable, partly because price and income elasticities of demand are generally highly inelastic. Also, consumers changed their tastes during 1954-67; they prefer less flour- and meal-type products. As a result, value of shipments of the industry increased relatively little between 1954 and 1967.

Size distribution of firms seems to be responding to their relative efficiencies. The National Commission on Food Marketing found most establishments leaving the industry were small plants with high per unit costs. A few large plants were closed also, because they were faced with high costs. With this development, concentration in the industry declined from 1954 to 1967 (table 36).

Integration in wheat flour milling has stabilized. In the past, some firms producing consumer products from flour integrated back into flour milling and today mainly mill flour for their own use. Firms which primarily milled integrated forward by increasing their product line of consumer items made from flour. At the same time, many of these companies expanded in a conglomerate nature into other product areas. As a result, flour milling operations of many large firms are only a small part of total company operations.

In the early 1960's, air classification was discussed as a major technological innovation in flour milling. This process was to enable mills to obtain closer tolerance on protein levels, particle size, and ash content of flour. Apparently, this technology has limited value in real world operations because very few mills have installed the equipment. No new installations are expected.

Flour milling profit rates depend largely on the type of flour produced. The bakery flour market is highly competitive and milling profit rates are low. The prepared mix market has many differentiated products and milling profit rates are higher.

Cereal Preparations

Structure of the cereal products industry was quite stable between 1954 and 1967. Number of establishments remained at about 45, although number of firms declined slightly. Concentration was relatively unchanged; the four largest firms accounted for 88 percent of total shipments.

Table 35.--Grain mill industries: Companies and establishments, value of shipments, value added by manufacture, and capital expenditures, census years 1954-67

Item and year	Grain mill industries						Total
	Flour and meal	Cereal prep- arations	Rice milling	Blended and prepared flour 1/	Wet corn milling		
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							
<hr/>							

1/ Data for 1963 and 1967 include refrigerated doughs; earlier data do not.

Note: NA = not available.

Source: Bur. of the Census, Census of Manufactures, U.S. Dept. Commerce.

Table 36.--Concentration of value of shipments among the four and eight largest companies manufacturing grain mill products, bakery products, and spaghetti and macaroni, census years 1954-67

Industry	Value of shipments accounted for by--						
	4 largest companies				8 largest companies		
	1954	1958	1963	1967	1954	1958	1963
	<u>Percent</u>						
Grain mill products:							
Flour and meal	40	38	35	30	52	51	50
Cereal preparations ...	88	83	86	88	95	95	96
Rice milling	41	43	44	46	60	64	66
Blended and prepared							
flour	NA	NA	70	68	NA	NA	82
Wet-corn milling	75	73	71	68	93	92	93
Bakery products:							
Bread and related							
products	20	22	23	26	31	33	35
Cookies and crackers .:	NA	NA	59	59	NA	NA	68
Macaroni and spaghetti :	26	25	31	31	37	41	47

Note: NA = not available.

Source: Bur. of the Census, Census of Manufactures, U.S. Dept. Commerce.

The stable structure is due, in part, to the dominant position of the leading companies and relatively high barriers to entry into the industry. The breakfast cereal market has a proliferation of differentiated products. Advertising and promotion expenses are significantly higher per dollar of sales than for other industries of the food grain sector. High cost of promoting new cereal products is an effective barrier to entry for new firms.

Blended and Prepared Flour

Both number of companies and plants in this industry declined about 10 percent between 1954 and 1958 and between 1963 and 1967. Data for 1963 and 1958 are not comparable because later years include refrigerated dough. Firms which blend and prepare flour mixes are in competition with flour milling firms which are vertically integrated into consumer products made from flour. These flour milling firms have a broader economic base and are likely to integrate vertically into the blended-flour and prepared-flour mix markets as relative profitability increases. A probable result would be a further decline in firms in the blended and prepared flour industry.

Rice and Wet-Corn Milling

The rice milling industry showed a modest decline in number of companies and establishments from 1954 to 1967. This decrease occurred even though domestic per capita consumption increased approximately 40 percent during the period and the export market expanded substantially. Value of shipments of the industry doubled. Small firms left the industry because they could not service the increased volume per sale in the market. Buyers turned to larger mills which could easily and more efficiently handle the large sales. Consequently, industry concentration has increased slightly.

Number of wet-corn millers declined a third between 1963 and 1967. Firms at locations with comparative economic disadvantages merged. Firms with multi-plant operations closed some of the more inefficient plants and total number of plants in the industry declined about a fourth.

Bakery Products

Number of plants producing bread and other bakery products decreased about a third during 1954-67 (table 37). The decline was particularly pronounced in the North East and North Central parts of the country where the majority of plants are located (table 38). Changes in structure are partially explained by population shifts, per capita demand, and improved production and marketing technology.

Increases in market demand for bread and bread-type rolls are largely due to increases in population. Markets showing the greatest growth are those with high immigration; markets with stable consumption have static populations. Bread bakers can't rely on either price reductions or increasing consumer income to have much effect on per capita consumption. Quantity of bread products demanded is very inelastic with respect to changes in price and income. Sweet goods have not been studied in much detail, however; for these, quantities demanded would probably respond quite readily to price and income changes.

To reduce per unit production costs, wholesale bakers are adopting continuous mix and bulk handling of ingredients for bread and rolls. Increased efficiency of large plants and changes in total demand have caused the largest decline in numbers of plants with five to 50 employees. Plants with one to four employees (approximately 1,600-1,700 plants) have not been greatly affected, mainly because they are located in isolated market areas, provide special services, or specialize in cake and other sweet goods production.

Studies of bread distribution efficiency have indicated that increased marketing efficiency may be obtained through vertically integrated grocery chain bakers. Such bakers avoid the costly rack service distribution system because they usually deliver baked goods on pallets to each store. Instore personnel stock the bread racks along with other activities.

Chainstore bakers' share of the value of total industry production has remained relatively constant since 1958, at about 10 percent. Average size of chain bakeries has increased as number of plants has fallen. Capital expenditures have risen, probably because firms have replaced small-sized facilities with larger, more modern plants.

Table 37.--Industries baking bread and related products, and cookies and crackers: Companies and establishments, value of shipments, value added by manufacture, and capital expenditures, census years 1954-67

Item and year	Bread and related products					Cookies and crackers
	Wholesale	Grocery chain	Home service	Retail multi-outlet ^{1/}	Total	
	<u>Number</u>					
Companies:						
1954	NA	NA	NA	NA	5,470	NA
1958	NA	NA	NA	NA	5,305	280
1963	NA	NA	NA	NA	4,339	286
1967	NA	NA	NA	NA	3,445	286
Establishments:						
1954	5,426	142	217	318	6,103	311
1958	5,240	178	361	247	6,026	339
1963	4,287	153	281	289	5,010	356
1967	3,751	128	35	128	4,042	348
	<u>Million dollars</u>					
Value of shipments:						
1954	2,617.5	271.1	333.5	123.0	3,345.1	806.
1958	3,130.4	382.5	406.1	179.6	4,098.6	982.
1963	3,508.2	465.5	333.5	198.8	4,506.0	1,150.
1967	4,400.7	468.3	98.2	135.4	5,102.6	1,363.
Value added by manufacture:						
1954	1,275.5	108.9	189.3	63.1	1,636.8	420.
1958	1,613.3	168.8	244.4	92.4	2,118.9	523.
1963	1,868.2	225.9	201.5	108.1	2,403.7	627.
1967	2,390.4	229.4	58.0	75.2	2,753.0	741.
Capital expenditures:						
1954	60.6	4.9	7.7	2.6	75.8	NA
1958	81.7	7.5	9.9	5.1	104.2	15
1963	81.3	6.9	4.3	2.8	95.3	26
1967	115.2	9.2	1.0	2.5	127.9	24

^{1/} Bakeries selling chiefly through nonbaking outlets operated by same company.

Note: NA = not available.

Table 38.--Plants manufacturing flour and meal, and bread and related products, by region, census years 1954-67

Industry and year	Region					
	North East	North Central	South Atlantic	South Central	West	United States
	Number					
Flour and meal:						
1954	85	241	217	171	89	803
1958	85	227	232	180	90	814
1963	75	183	162	122	76	618
1967	74	170	134	105	58	541
Bread and related products:						
1954	2,092	1,896	518	749	848	6,103
1958	2,142	1,768	564	692	819	5,985
1963	1,826	1,395	483	563	743	5,010
1967	1,474	1,090	414	475	589	4,042

Source: Bur. of the Census, Census of Manufactures, U.S. Dept. Commerce.

The typical bakery market was characterized behaviorally by a Nebraska study as being a differentiated bilateral oligopoly. Wholesale baking firms compose one side of the bilateral oligopoly and retail grocers constitute the other side. Virtually all markets have an oligopolistic core of wholesale baking companies surrounded by a fringe of smaller bakers. Intermingled in the market fringe are small retail bakeshops. On the other side of the bilateral oligopoly, retail grocery markets have a concentrated core of supermarket grocers and a fringe of smaller stores. The two concentrated cores of market power--chain supermarkets and wholesale bakers--negotiate terms under which the differentiated commodity (bread) is sold, thus forming a differentiated bilateral oligopoly. Terms include allocation of shelf space, position in the shelf, and consignment rate.

Retaining control of the bread all the way to the consumer is a source of market power for wholesale bakers. Extent of a wholesaler's market power is based on its market share and on its success in maintaining or improving it. Wholesaler's advertised brands lead to brand loyalty and, therefore, help maintain a firm's market share. Instore services of restocking, straightening displays, callbacks, and so on, also act to preserve a wholesaler's market share and maintain a quality image with consumer.

The supermarket chains (corporate, cooperative, and voluntary) can exert their market power in two ways. First, most larger chains have sufficient bread sales to justify baking their own bread. This situation concerns wholesale bakers because private-label bread sold at lower, traffic-building prices

drastically affects demand for their own advertised brands. An examination of per unit costs by the FTC indicated that supermarkets cannot produce bread any cheaper than wholesale bakers. But supermarkets' total per unit costs are lower because of lack of advertising, large drop deliveries, and low losses from stale bread. These lower per unit costs may explain in part why supermarkets can sustain a price policy for their brands of 2-5 cents less per pound than prevailing prices for wholesale brands.

Second, an implicit threat exists that supermarkets not producing their own bread may decide to do so. As a result, some wholesale bakers have undertaken private-label production contracts with chain supermarkets, probably at prices comparable to what it would cost chains to bake their own. The National Commission on Food Marketing found that independent wholesale bakers increased the proportion of their private-label production from 12 percent in 1960 to 20 percent in 1964. Cooperative and multistate corporation wholesale bakers raised proportions of their private-label production from 2.5 to 7.6 percent and 0.7 to 3.7 percent, respectively. Though producing private-label bread means that wholesale bakers lose control of their bread at the retail outlet, it does permit them to stay in business and may be their best assurance of keeping their own brand on the chainstore's shelf.

Cookies and Crackers

Number of plants and firms in the cookies and crackers industry has been relatively constant (table 37). However, average value of shipments per plant rose about two-thirds between 1954 and 1967. Per capita demand for industry products, particularly snack items, has been increasing as a result of increased consumer disposable income and changing consumer tastes. This shift is offsetting the demand for less expensive cookies and crackers, which are primarily consumed by low-income groups.

The expense of advertising and promoting a new snack item is a substantial barrier to entry for a new firm; however, existing firms find it profitable to open new plants. The four largest firms producing cookies and crackers held 59 percent of the total market in 1967, the same as in 1963; the top eight firms' share rose from 68 to 70 percent between 1963 and 1967. The increased concentration may be due to merger and acquisition activity which has been extensive in recent years.

Macaroni and Spaghetti

Number of companies and establishments producing macaroni and spaghetti products declined slightly between 1954 and 1967, as shown in the following tabulation. However, value of industry shipments was over two-thirds greater in 1967 than in 1954.

Decrease in company numbers may be due to merger and acquisition activity among firms. Value of shipments could have risen because of increased value of macaroni and spaghetti products, as well as more production of products

with higher value. Such strategies seem to offset the pressure of a decline in per capita consumption because of consumer incomes and consumer tastes that are shifting away from starchy foods.

Year :	Companies :	Establishments :	Value of shipments :	Value added by manufacture :
		<u>No.</u>		<u>Mil. dol.</u>
1954 .:	226	233	154.8	52.6
1958 .:	205	214	180.2	67.1
1963 .:	207	221	222.9	96.0
1967 .:	190	205	266.0	119.7

Outlook

Food grain industries producing products with a high income elasticity of demand or appeal to consumers' taste will be the most profitable. Such products include snack items and convenience, or preprocessed foods. Firms in these industries will probably increase the size of their plants and build a few new ones to supply the increased demand.

Industries which produce products with inelastic price and income demand curves and decreasing consumer preference rely heavily on population growth to maintain or improve total demand. Since the rate of population increase is declining, these industries will be faced with contracting markets.

FRUITS AND VEGETABLES

Like most other subsectors of the food processing industries, the fruit and vegetable subsector is continually changing. On the demand side, determinants--including population, income, consumer tastes and preferences, and commodity prices --continue to change, with resulting shifts of demand curves for individual products. On the supply side, new technology plus changes in costs of inputs, Government policies, and other factors serve to modify firm cost structures. These changes generate strong economic pressure on individual firms to seek more efficient positions. Over time, firm adjustments lead to industry modifications in number and size of firms, plant location, integration, and concentration. Attention here is focused on two segments of the fruit and vegetable marketing subsector--wholesaling fresh produce and processing, including canning, freezing, and drying.

Processing Industries

Number of Establishments

Establishments engaged primarily in canning fruits and vegetables declined from 1,758 in 1954 to 1,223 in 1967, or 30 percent (table 39). A decrease also occurred in number of employees. In contrast, total payroll and value added by manufacture increased sharply as value of total shipments rose during 1954-67.

Table 39.--Processed fruits and vegetables: Establishments, employees, payroll, value added by manufacture, and value of shipments, by type of processing, census years 1954-67

Type of processing and year	Establishments	All employees		Value added by manufacture	Value of shipments
		Number	Payroll		
	<u>Number</u>	<u>Thousands</u>	<u>Million dollars</u>	<u>Million dollars</u>	<u>Million dollars</u>
Canned fruits and vegetables:					
1954	1,758	119.8	354.7	830.0	2,228.9
1958	1,607	100.1	319.7	808.3	2,227.0
1963	1,430	102.4	382.1	1,029.5	2,742.8
1967	1,223	100.1	473.8	1,413.3	3,467.8
Frozen fruits and vegetables:					
1954	266	21.4	59.2	148.5	417.1
1958	426	39.5	126.8	323.8	1,025.9
1963	650	51.7	202.4	550.2	1,548.7
1967	607	64.3	293.9	759.3	2,066.8
Dehydrated food products:					
1954	148	7.0	22.0	55.2	192.2
1958	161	7.6	28.3	75.5	273.3
1963	176	9.2	41.7	115.8	318.7
1967	178	11.1	58.0	167.7	420.8

Source: Bur. of the Census, Census of Manufactures, U.S. Dept. Commerce.

In the same period, establishments engaged primarily in freezing fruits and vegetables more than doubled, although the total number declined slightly between 1963 and 1967. In 1967, the freezing industry was about one-half the

size of the canning industry, measured by number of establishments and value added by manufacture. The freezing industry has grown rapidly in employees, payroll, value added by manufacture, and value of shipments. The latter quadrupled from 1954 through 1967.

Establishments engaged in manufacturing dehydrated food products increased steadily between 1954 and 1967, for a net gain of 21 percent. The number of establishments is about one-third that in the freezing industry and one-seventh that in the canning industry. Also, dehydrated food manufacturers tend to produce other items besides fruit and vegetable products.

Size of Establishments

Between 1954 and 1967, while the total number of fruit and vegetable canning establishments was decreasing, average size, measured by both employment and output, was increasing. Average value added by manufacturing per establishment increased from \$472,000 in 1954 to \$1.2 million in 1967.

Both total number and average size of establishments freezing fruits and vegetables increased between 1954 and 1967. Average value added by manufacturing increased from \$558,000 per establishment to \$1.2 million.

Dehydration establishments also increased in number and size during 1954-67. However, their average size was considerably smaller than that of canning and freezing establishments. As measured by value added by manufacturing, average size of dehydration establishments increased from \$373,000 in 1954 to \$942,000 in 1967.

Size Distribution

Practically all of the drop in canning establishments between 1954 and 1967 occurred in size groups of less than 100 employees (table 40). Establishments with 100 to 499 employees rose slightly. The largest size group, 500 and more employees, dropped from 29 firms in 1954 to 20 in 1958, but subsequently increased to 26 in 1967. This group contained around 2 percent of total establishments throughout the period. Forty percent of all establishments in the canning industry have less than 20 employees.

Frozen fruit and vegetable establishments with 100 or more employees increased steadily from 1954 to 1967. In contrast, establishments with less than 100 employees rose from 1954 to 1963 but declined in 1967. Nevertheless, in 1967, 40 percent of all establishments had one to 19 employees. Five percent of all freezing establishments were in the largest size group, in contrast to only 2 percent of the canning firms.

Dehydrating establishments are of smaller average size than canning and freezing plants. Throughout 1954-67, there were more firms in the one-to-four employee size group than any other. Although establishments in all size groups increased, the group with 100 or more employees grew the most.

Table 40.--Size of fruit and vegetable processing establishments, by number of employees, census years 1954-67

Year	Establishments with--					Total
	1-4 employees	5-19 employees	20-99 employees	100-499 employees	500 or more employees	
	----- <u>Number</u> -----					
Canners:						
1954	377	383	715	254	29	1,758
1958	285	409	627	266	20	1,607
1963	276	318	547	266	23	1,430
1967	281	210	433	273	26	1,223
Freezers:						
1954	41	57	104	59	5	266
1958	51	112	138	111	14	426
1963	139	165	194	136	16	650
1967	135	110	186	147	29	607
Dehydrators:						
1954	45	39	42	22	0	148
1958	49	45	41	26	0	161
1963	42	54	57	23	0	176
1967	51	46	46	35	0	178

Source: Bur. of the Census, Census of Manufactures, U.S. Dept. Commerce.

Location

Number of fruit and vegetable canning establishments declined in all regions of the country from 1954 to 1967. The decrease was greatest in the North Central Region (table 41). Establishments in the Northeast and Southern regions also dropped, but their share of the total did not change. In contrast the West's share of the total increased from 21 to 24 percent, although the actual number of establishments in the region dropped from 364 to 298.

Freezing establishments increased throughout the country during 1954-67. The sharpest rise was in the North Central Region, where the number jumped from 30 to 145, or from 11 to 24 percent of all establishments. The number in the Northeast more than doubled, but the share of the total remained unchanged at 22 percent. The West also had a large increase in establishment but it did not keep pace with growth in the other regions and its share of the total dropped sharply from 41 to 33 percent. Similarly, establishments in the South declined from 26 to 21 percent of the total. In 1967, the South had the lowest number of freezing establishments.

Table 41.--Fruit and vegetable processing establishments, by type,
census years 1954-67

Type and year	Northeast	North Central	South	West	United States
	<u>Number</u>				
ners:					
954	355	553	486	364	1,758
958	348	459	436	364	1,607
963	303	404	385	338	1,430
967	248	341	336	298	1,223
ezers:					
954	57	30	69	110	226
958	95	68	109	154	426
963	145	153	140	212	650
967	135	145	130	198	608
hydrators:					
954	1/ 29	2/	3/	4/ 119	148
958	1/ 28	2/	3/	4/ 133	161
963	1/ 28	2/	7	141	176
967	20	15	7	136	178

- / Includes firms in North Central Region.
- / Included in Northeast.
- / Included in West.
- / Includes firms in South.

Source: Bur. of the Census, Census of Manufactures, U.S. Dept. Commerce.

Data on location of food dehydrating establishments are not as complete for other processors. In 1967, more than three-fourths of these establishments were located in the West. The Northeast Region ranked second with 11 percent, the North Central had 8 percent, and the remaining 4 percent were the South. Based on available data, little change has occurred in location these establishments since 1954.

ritical Integration

Fruit and vegetable growing and processing has become more interrelated recent years, although most production and processing is not integrated. However, contracts between bargaining associations and growers and processors are more important than formerly. As number of growers declined, it became easier for producers to use these approaches to improve their chances of obtaining better prices and terms of trade.

Fruit processing cooperatives account for an important share of all fruit processing activity. In 1964, cooperatives packed approximately 46 percent of dried fruits (figs, prunes, and raisins); 31 percent of canned deciduous fruits and juice; 18 percent of frozen deciduous fruits, berries, and juice; and 42 percent of processed citrus fruits and juice. For some individual fruits, cooperatives are dominant. Between 1952 and 1964, sales by fruit and vegetable processing cooperatives increased from \$171.6 million to \$476.3 million. Their share of the total market increased although number of cooperatives decreased (13).

Contracts

Only a minor portion of the vegetables used for processing are obtained through open-market purchases. Processors usually contract with producers before crops are grown to ensure that supplies of favored varieties and qualities will be more nearly adequate.

Prices are indicated in a large proportion of contracts, either in specific price commitments or in methods of price calculation. Contracts contain many different specifications for such items as variety, grade, seed, fertilizer, and cultural practices. Most contracts specify arrangements for use of labor, equipment, materials, and, in some instances, financing.

Bargaining Associations

Bargaining associations act as agents in establishing contracts between their members and buyers, most importantly for processing crops. These organizations have been used by dairy producers for many years, but in recent years, their use also has grown dramatically in the fruit and vegetable industry. Nearly all fruit and vegetable bargaining associations in existence today were organized within the past 15 years. The American Farm Bureau has taken an especially active interest in bargaining and in 1965 had affiliated organizations operating in 35 States to help organize and assist producers in their bargaining activities. Even so, most associations have required several years to enlist enough grower support to bargain effectively with processors. Although some associations may never reach the negotiating stage, their existence has nevertheless affected conduct of processors in relation to growers.

Government Programs

The fruit and vegetable processing industry is relatively free of public programs in marketing both the raw and finished product. In this industry, there is no Government acreage control or price support program in operation but machinery does exist for producers and processors to institute market agreement and order programs. Very few of these orders are in effect for processing fruits and vegetables; most market orders relate to fresh market commodities. Aside from promotion-oriented State orders, the only such order in effect for processing crops are for cranberries and tart cherries.

Industry Concentration

Although number of firms in the largest size group (total assets of \$10 million or more) is relatively small, total assets, gross sales, and profits are highly concentrated. In 1968, about 71 percent of assets, 62 percent of sales, and 75 percent of profits for all corporate firms in the processed fruit and vegetable industries were accounted for by the largest firms (table 42). Between 1954 and 1968, firms with assets over \$10 million increased their share of total assets and gross sales by 7 percentage points and profits after taxes, by 11 percentage points. Shares of these items accounted for by medium-sized firms declined over the period. However, profits after taxes of the smallest firms increased sharply from 1.2 percent of the total in 1954 to 3.4 percent in 1968.

The proportion of total value of production accounted for by the four largest companies trended downward from 1954 through 1967 (table 43). By 1967, the four largest fruit and vegetable canners accounted for 22 percent of production, the four largest freezers of fruits and vegetables had 24 percent of production, and the four largest food dehydrators represented nearly a third of production. At the 20-firm level, both canners and freezers accounted for a little over half of total value of production. However, for the canners, the share had remained quite stable since 1954, while the share of the 20 largest freezers had trended sharply downward. The share accounted for by the 20 largest dehydrators was considerably higher than for canners and freezers, 75 percent in 1967, but this proportion was a decline from 87 percent in 1954.

Conditions of Entry

Two structural characteristics are of particular importance in the processed fruit and vegetable industries as possible barriers to entry of new firms--economies of size and product differentiation.

Economies of size in production determine the efficient size of a firm. This size may or may not be a barrier to entry, depending on its relation to total industry output. The larger the efficient size relative to the industry, the more difficult the entry for a new firm.

The types of economies of size in fruit and vegetable canning and freezing plants have been shown in numerous studies in which product cost estimates for various sized model plants are developed with economic-engineering techniques.

In a series of cooperative studies between North Carolina State University and the Economic Research Service, USDA, canning plant size relationships were examined. For canned whole tomatoes, costs per case declined as output per hour and number of hours of operation per season increased (table 44). The smallest seasonal output that returned a profit was 70,000 cases (100 cases per hour for 700 hours). This volume is about 0.02 percent of the fruit and vegetable processing industry's total annual output and is not considered large

Table 42.--Canned and preserved fruits and vegetables, and seafood: Firms, assets, gross sales, and profits, by size group, selected years, 1954-68

Item and year	Asset size of firm				
	Under \$100,000	\$100,000-999,000	\$1 million-9,999,000	\$10 million or more	Total
	<u>Number</u>				
Firms:					
1954	207	452	164	20	843
1958	575	1,012	264	32	1,883
1963	696	956	304	41	1,997
1967	608	811	341	45	1,805
1968	566	621	341	60	1,588
	<u>Percent</u>				
Total assets:					
1954	0.6	10.2	25.7	63.5	100.0
1958 .....	.9	13.0	27.7	58.4	100.0
1963 .....	.7	11.2	23.5	64.6	100.0
1967 .....	.4	6.7	23.6	69.3	100.0
1968 .....	.5	5.9	22.7	70.9	100.0
Gross sales:					
1954	1.0	15.0	29.9	54.1	100.0
1958	1.4	17.5	29.4	51.7	100.0
1963	2.0	15.5	26.0	56.1	100.0
1967	2.5	9.2	28.0	61.3	100.0
1968	1.6	9.5	27.0	61.9	100.0
Profits after taxes:					
1954	1.2	10.4	24.0	64.4	100.0
1958 .....	.4	2.7	24.0	72.9	100.0
1963	1.6	9.9	16.4	72.1	100.0
1967	1.2	3.3	24.4	71.1	100.0
1968	3.4	6.4	15.1	75.1	100.0

Source: Int. Rev. Serv. Source Book of Statistics of Income, Corporation Income Tax Returns, U.S. Dept. Treas.

Table 43.--Value of shipments in fruit and vegetable processing industries,
census years, 1954-67 ^{1/}

Type of industry and year	Value of shipments accounted for by--			
	4 largest firms	5-8 largest firms	9-20 largest firms	20 largest firms
	----- Percent -----			
Canned fruits and vegetables:				
1954	28	11	13	52
1958	29	10	16	55
1963	24	10	16	50
1967	22	12	18	52
Frozen fruits and vegetables: ^{2/}				
1954	39	16	16	71
1958	31	12	24	67
1963	24	13	17	54
1967	24	12	19	55
Dehydrated food products: ^{3/}				
1954	48	21	18	87
1958	45	21	16	82
1963	37	19	24	80
1967	32	18	25	75

^{1/} Includes value of primary and secondary products made, and miscellaneous receipts. Primary product specialization for all firms in the industry was 90 percent in 1954, 1958, and 1967 and 89 percent in 1963.

^{2/} Based on SIC classification which excluded frozen prepared foods and soups. Includes primary and secondary products made, and miscellaneous receipts.

^{3/} Based on SIC classification which in 1963 included nuts, as well as dried and dehydrated fruits and vegetables, and packaged soup mixes from dehydrated ingredients. 95 percent of total output of plants in the industry has consisted of dried and dehydrated products.

Source: Bur. of the Census, Census of Manufactures, Concentration Ratios in Manufacturing, U.S. Dept. Commerce.

Table 44.--Canned whole tomatoes: Estimated plant operating costs and net return, by length of season and rate of output

Rate of output	Length of operating season in hours		
	300	500	700
	Annual operating costs per case of 24/no. 303 cans <u>1/</u>		
	Dollars		
Cases per hour:			
100	4.02	3.60	3.42
400	3.65	3.28	3.12
800	3.30	3.03	2.19
1,200	3.12	2.91	2.82
1,500	3.02	2.85	2.78
	Annual net return per plant <u>2/</u>		
	Dollars		
100	-15,485	-5,025	5,435
400	-18,380	43,900	106,180
800	48,437	188,587	328,737
1,200	136,565	352,667	568,769
1,500	215,565	487,207	753,845

1/ Assumes raw product cost of \$35 per ton and other costs as listed in source.

2/ Assumes raw product cost of \$35 per ton and selling price of \$3.50 per case.

Source: Mathia, G.A., Pearson, J.L., and Ela, O. An Economic Analysis of Whole Tomato Canning Opportunities in the South. N.C. State Univ., Econ. Inf. Rpt. 17, May 1970.

enough to be a barrier to entry. Net returns increased throughout the range of output covered, to a maximum of 1.05 million cases (1,500 cases per hour for 700 hours). This maximum is about 3 percent of the industry total, which may be large enough to cause a barrier to entry. Thus, for large-volume commodities such as tomatoes produced in single-product plants, a firm might enter the market and operate at a profit, but attaining a highly efficient size and becoming fully competitive could be quite difficult.

Canned okra is a commodity with relatively small industry volume. The minimum profitable output in a single-product plant was found to be 50,000 cases per season, about 15 percent of total industry output. Returns to size continued through 400,000 cases, more than total annual industry sales. Clearly, the barrier of entry to a single-product okra canning plant is high. In actual practice, the problem of large plant size is reduced through multiple-product operations. In these firms, the large volume necessary for high efficiency can be produced with reduced impact on individual commodity markets.

Economies of size may exist in marketing or distribution as well as in production. However, roughly two-thirds of canners and freezers employ brokers rather than develop their own marketing facilities. This practice tends to reduce barriers to entry arising from economies of size in marketing.

A second aspect of condition of entry, product differentiation, also has considerable importance in the fruit and vegetable processing industry. Product differentiation is accomplished through labeling practices and advertising.

Among both canning and freezing plants, slightly more than one-half the total fruit and vegetable pack was marketed as packer-label merchandise in 1964 (4). Among canning plants, a positive relationship was found between size of processing facility and proportion of plant output marketed as packer-label merchandise, while among freezing plants, a negative relationship existed between these two factors. About a third of the output of small canning plants was marketed as packer label, compared with three-fifths of the output of large canning plants. In contrast, roughly three-fourths of the output of small freezing plants was marketed as packer label, compared with half that of large freezing plants.

Product differentiation is developed and exploited primarily through advertising. If large firms are able to advertise more than small firms, it could constitute a barrier to entry. In 1964, 67 percent of large canning and freezing plants engaged in direct consumer-oriented advertising, including that on the radio and in newspapers, compared with 29 percent of medium-sized plants and 7 percent of small plants. Similarly, merchandising services for the retail trade, such as point-of-sale materials, were provided by about 67 percent of large-sized plants, compared with 27 percent of medium-sized and 7 percent of small plants.

Large firms also allocate a greater percentage of their gross sales to advertising than do smaller firms. For selected years during 1954-68, expenditures for advertising by large firms ranged from 3.3 to 4 percent of sales (table 45). Firms in the next smaller size group, \$1 million to \$10 million total assets, spent a small and declining percentage of gross sales for advertising over the period. Expenditures by the two smallest groups of firms, though quite erratic during the period, were considerably less than those by large firms.

Table 45.--Advertising expenditures as percentage of gross sales for firms canning and preserving fruits and vegetables and seafoods, by size of firm, selected years, 1954-68

Year	Asset size of firm					Average
	Under \$100,000	\$100,000- 999,000	\$1 million- 9,999,000	\$10 million or more		
	Percent					
1954	0.9	1.0	1.8	3.8		2.8
1958	1.2	1.0	1.8	3.6		2.6
1963	.8	1.0	1.3	4.0		2.8
1967	2.8	.5	1.2	3.5		2.6
1968	1.3	.3	.8	3.3		2.3

Source: Int. Rev. Serv. Source Book of Statistics of Income, Corporation Income Tax Returns, U.S. Dept. Treas.

Of the total amount spent for advertising, a large and increasing percentage was spent by large firms. In 1954, their share of the total was 74 percent and by 1968, it was 89 percent (table 46). The smallest firms accounted for only 0.9 percent of total advertising expenditures.

Table 46.--Distribution of advertising expenditures among firms canning and preserving fruits and vegetables and seafoods, by firm size, selected years, 1954-68

Year	Advertising expenditures for firms with asset size of--				Percent
	Under \$100,000	\$100,000- \$999,000	\$1,000,000- \$9,999,000	\$10 million or more	
1954	0.3	5.6	19.8	74.3	
1958	.6	6.3	19.8	73.3	
1963	.6	5.7	12.6	81.1	
1967	2.6	1.7	12.7	83.0	
1968	.9	1.2	8.7	89.2	

Compiled from: Source Book of Statistics of Income, Corporation Income Tax Returns, Int. Rev. Serv., U.S. Dept. Treas.

Industry Profits

The general level of profits serves as an approximate indicator of the extent of competition and overall performance in an industry. For a sample of firms from the canned and preserved fruits and vegetables and seafoods industry, profits as a percentage of sales were 2.34 percent in 1963 (table 47). In 1968, they rose to 2.83 percent and dropped sharply the following year to 1.93 percent. Profits as a percentage of tangible net worth and of net working capital showed similar trends. Compared with those in 71 lines of manufacturing and construction businesses, percentages in the canned and preserved fruits, vegetables, and seafoods industries were generally below average. In 1968, these industries ranked 56th in profits on net sales, 67th in profits on tangible net worth, and 44th in profits on net working capital.

Table 47.--Selected measures of profits of firms canning and preserving fruits and vegetables, and seafoods, 1963, 1968, and 1969

Year	Firms reporting	Net profits on--		
		Net sales	Tangible net worth	Net working capital
	<u>Number</u>		<u>Percent</u>	
1963	58	2.34	8.35	14.54
1968	68	2.83	9.35	16.19
1969	68	1.93	5.79	13.26

Source: Key Business Ratios, Dun and Bradstreet, Inc.

Fresh Fruit and Vegetable Wholesaling

The wholesaling segment of the fresh fruit and vegetable industry, as classified by Bureau of the Census, contains three groups--merchant wholesalers, agents and brokers, and assemblers. Assemblers consist of firms located at shipping point or production areas that receive produce from producers and assemble it in a form ready for shipment to terminal markets. Agents and brokers primarily make arrangements for transferring the produce through the marketing channel ordinarily without physically handling it. Merchant wholesalers are located at terminal markets and mainly receive produce in bulk quantities and break it down for sale to retailers or other wholesalers.

Number of Establishments

As measured by number of establishments, merchant wholesalers are by far the largest segment of the wholesale fresh fruit and vegetable industry (table 48). In 1967, there were approximately five times as many merchant wholesalers as agents and brokers or as assemblers. However, during 1954-67, the trend

Table 48.--Fresh fruit and vegetable wholesalers: Establishments, total sales, and average sales per establishment, census years 1954-67

Item and year	Merchant wholesalers	Agents and brokers	Assemblers of farm products
	<u>Number</u>		
Establishments:			
1954	6,520	893	1,993
1958	6,291	989	2,297
1963	5,123	1,085	2,106
1967	5,284	1,029	1,164
	<u>Million dollars</u>		
Sales:			
1954	3,262	1,591	1,288
1958	3,092	1,880	1,458
1963	2,981	2,088	1,505
1967	3,973	2,467	1,057
	<u>1,000 dollars</u>		
Average sales per establishment:			
1954	500	1,782	646
1958	492	1,901	635
1963	582	1,924	715
1967	752	2,398	908

Source: Bur. of the Census. Census of Business, Wholesale Trade, U.S. Dept Commerce.

in number of establishments in each of these groups was quite different. Merchant wholesalers decreased, with a net decline of 19 percent. In contrast, agents and brokers increased, with net gain of 15 percent. Assemblers remained fairly stable at around 2,000 establishments from 1954 through 1963, but dropped sharply in 1967, with a net loss of 42 percent.

Sales of merchant wholesalers fell from 1954 through 1963 and rose sharply in 1967, for a net gain of 22 percent. Sales of agents and brokers increased steadily throughout the entire period, with a net gain of 55 percent. In contrast, sales of assemblers rose in 1958 and 1963 but dropped sharply in 1967, for an overall loss of 18 percent.

Size of Establishment

As measured by annual sales per establishment, the agents and brokers group averaged largest, assemblers next, and merchant wholesalers, smallest (table 48). All three groups trended upward in average establishment size during the period. Agents and brokers increased 35 percent in sales per establishment; assemblers, 41 percent; and merchant wholesalers, 50 percent.

Location

Only the West showed a rise in number of merchant wholesalers during 1954-67, with all of the increase occurring between 1963 and 1967 (table 49). The share of total number of establishments located in the West rose to 22 percent in 1967, up from 17 percent in 1954. The Southern Region also increased its share of total number of firms, from 27 percent in 1954 to 30 percent in 1967. Although dropping in number of establishments, the South lost less than the Northeast and North Central regions, and became the region with the largest number of establishments. The Northeast ranked second at 28 percent and the North Central Region was fourth with 20 percent.

Table 49.--Location of fresh fruit and vegetable wholesale establishments, census years 1954-67

Item and year	Northeast	North Central	South	West
	<u>Number</u>			
Merchant wholesalers in--				
1954	2,092	1,580	1,734	1,114
1958	1,874	1,501	1,849	1,067
1963	1,565	1,144	1,501	913
1967	1,487	1,079	1,592	1,126

Source: Bur. of the Census, Census of Business, Wholesale Trade, U.S. Dept. Commerce.

Vertical Integration

Formalized marketing arrangements are not as widespread in the fresh fruit and vegetable segments as in the processing segment. However, growers for the fresh market have used considerably the machinery for instituting marketing agreement and order programs. These programs represent a partnership between industry and government. Under State programs, primary emphasis generally has been placed on promotional activity; under Federal programs, greater emphasis is placed on market practices and orderly marketing. Principal types of activities authorized under Federal marketing agreement and order programs include (a) regulation of quality, (b) regulation of quantity, (c) standardization of containers or packs, (d) conducting and financing research and development projects, (e) prohibition of unfair trade practices, (f) price posting, and (g) collection and dissemination of marketing information.

Table 50 shows number of producers included and farm value of fruit, vegetable, and tree nut crops covered by Federal marketing agreements in 1970. In addition to the 46 Federal orders listed, other crops or production areas were organized under State legislation.

Apparently, direct buying, developed by large chains, has not reached the proportion expected. Data collected by the Market News Service indicate that fresh fruit and vegetable unloads delivered direct to chains in 23 U.S. cities remained close to a third of the total between 1964 and 1970.

Industry Profits

A sample of fresh fruit and vegetable wholesalers had median net profits of 1.1 percent of net sales in 1963, 1.3 percent in 1967, and 1.1 percent in 1968 (table 51). These were about half as large as profits per dollar of sales by fruit and vegetable processors. Profits on tangible net worth trended upward for fresh wholesalers and were higher in 1967 and 1968 than for processors. Net profits on net working capital also rose and were higher than for processors in all 3 years.

Profits as a percentage of sales for fresh fruit and vegetable wholesalers in 1963 ranked 15th among 32 lines of wholesale business, dropped to 20th in 1967, and 27th in 1968. However, in profits on tangible net worth and net working capital, fresh fruit and vegetable wholesalers ranked among the top three. These high positions largely reflect the relatively small working capital requirements resulting from rapid turnover of inventory in the fresh-produce wholesale business.

Table 50.--Fruit, vegetable, and tree nut marketing agreement and order programs in effect during fiscal year 1970

Order	Estimated :		Order		Estimated :	
	number of	Farm value	number of	Farm value	number of	Farm value
	commercial:		commercial:		commercial:	
	producers :		producers :		producers :	
	Number	1,000 dollars	Number	1,000 dollars	Number	1,000 dollars
Citrus fruits:						
California and Arizona Navel and						
miscellaneous oranges	4,600	57,018			160	2,528
California and Arizona Valencia					4,200	39,130
oranges	4,700	43,792			4,600	63,758
California and Arizona desert						
grapefruit	600	11,640			49	23,946
California and Arizona lemons	2,350	89,208			435	64,359
Florida oranges, grapefruit,					295	15,558
tangerines, and tangelos	15,500	376,034			146	4,788
Florida Indian River grapefruit	1,600	1/			342	17,989
Florida Interior grapefruit	7,000	1/			300	2,085
Florida limes	500	3,045				
Texas oranges and grapefruit	4,000	20,934			812	23,286
Deciduous fruits:					3,817	143,263
California Bartlett pears, plums, and					2,148	77,220
Elberta-type peaches	8,220	63,759			748	11,000
California nectarines	1,250	9,240			850	25,026
California olives	1,500	21,560				
California Tokay grapes	1,200	12,129			1,400	12,578
Colorado peaches	800	2,394			704	49,786
Florida avocados	600	3,629				
Georgia peaches	350	12,299			6,954	72,834
Idaho and Oregon prunes	250	1,942			9,000	52,296
Utah peaches	1,000	834			1,639	4,088
Washington apricots	1,000	610			86,860	311,451
Washington sweet cherries	1,000	8,092				
Washington peaches	1,500	494			237	21,305
Washington, Oregon, and California						
winter pears	1,800	14,066				
Washington and Oregon Bartlett pears ..	2,000	15,420				
Washington and Oregon prunes	1,000	3,835				
Cranberries	1,300	29,717				
Total (46 orders)						1,839,961

1/ Included under Florida grapefruit above.

2/ Marketing agreement only; covers States of Alabama, Florida, Georgia, Mississippi, South Carolina, Arizona, Arkansas, California, Louisiana, New Mexico, Oklahoma, Texas, Missouri, North Carolina, Tennessee and Virginia.

3/ Marketing order only.

Source: Consum. and Mktg. Serv., U.S. Dept. Agr.

Table 51.--Profits of fresh fruit and vegetable wholesalers as proportion of sales, net worth, and working capital, 1963, 1968, and 1969

Year	Firms reporting	Net profits as proportion of--		
		Net sales	Tangible net worth	Net working capital
		Percent		
1963	56	1.12	7.58	15.34
1968	63	1.32	10.17	17.06
1969	64	1.10	10.65	18.10

Source: Key Business Ratios, Dun and Bradstreet, Inc.

FATS AND OILS

Marketing of oilseeds and vegetable oils has been affected by many forces including increases in oilseed production, more use of vegetable oils and fats in food products, and greater importance of oilseeds and fats and oils in the export market. In response to these forces, the fats and oils industry has changed in organization and structure; processing methods and techniques; and size, number, and type of mills processing the various types of oilseeds.

Domestic per capita consumption of fats and oils for both food and industrial uses increased from about 70 pounds per person in the 1950's and early 1960's to about 80 pounds in 1970. The greater proportion of the increase occurred in consumption of food fats. In addition, the export market has become a major outlet for fats and oils commodities. In 1970, domestic production of fats and oils accounted for almost one-third of the world's total fats and oils supply. About two-fifths of U.S. production was exported. Oilseeds and fats and oils products have become the major U.S. dollar earner among agricultural exports.

Technical and scientific developments have brought about a high degree of interchangeability and substitutability among the various food fats. Substitution has occurred both among the three major food fat product groups--table spreads (butter and margarine), cooking fats (lard and shortening), and salad and cooking oils--as well as among products within each group. Since the early 1950's, butter consumption per person has dropped more than 50 percent, while margarine consumption has almost doubled. Similarly, direct lard use has dropped almost two-thirds, while shortening consumption per person has increased almost 65 percent and salad and cooking oils consumption has more than doubled.

Soybean oil dominates the domestic food fat market. It is continuing to gain an increasing share and use has more than tripled since 1950.

Number of Plants

During the past two decades, the fats and oils industry has experienced a drop in number of processing establishments and an increase in size of remaining plants because of new and more efficient machinery and equipment. As a result, operations have become more efficient and oil yield has increased. Such changes have occurred both at the first level of vegetable oil processing (soybean and cottonseed oil mills) and in the final stages (processing of vegetable oils into consumer products, such as margarine, shortening, salad and cooking oils, and salad dressing).

Cottonseed processing mills decreased 48 percent between 1954 and 1967, while soybean processing mills increased 16 percent. Number of establishments manufacturing consumer products--margarine, shortening, and cooking oils--fell between 1954 and 1958 but rose slightly between 1958 and 1967 (table 52).

Seasonal volume of soybeans crushed--the major U.S. oilseed crop--and volume of soybean oil produced increased more than threefold during the past two decades. The 1969-70 crush was the heaviest on record, resulting in the highest utilization of the soybean industry's crushing capacity during the past 20 years--96 percent. In contrast, volume of cottonseed and cottonseed oil produced during the 1969-70 season was only 6 percent above the 1950-51 crush. About three-fourths of the industry's crushing capacity was utilized during the 1969-70 season, which was also the highest level used during 1950-70.

Soybean processing plants are located mainly in areas of heavy soybean production or meal use. Until the mid-1940's, increase in number of plants occurred primarily in the Midwest; but since the 1950's, the increase has occurred primarily in the South, where soybean production has been rising more rapidly. Regional shifts in plant location accounted for 22 new soybean processing plants and 21 plant closings during 1957-67. Major net reductions occurred in the Corn Belt States; major net increases in plant numbers occurred mainly in the Plains States, lower Mississippi Valley, Middle Atlantic, and Southeastern regions. By the 1967-68 crop year, the 94 soybean processing plants were about equally distributed between the Corn Belt and other soybean production areas (19).

Size of Plant

While number of plants processing shortening and cooking oil was decreasing, average size was tending to increase. Value of shipments of shortening and cooking oil per establishment and average value added to products manufactured roughly doubled between 1954 and 1967. Similarly, shortening and cooking oil establishments employing less than 20 employees dropped 57 percent; those employing from 20 to 99 increased 27 percent; plants with 100 to 499 showed no change; and those with 500 or more doubled (table 53).

As extraction methods have changed, soybean processors have become considerably larger. Soybean oil mills presently crush three times as many soybeans, on the average, as in the early 1950's. Average value, or product shipments, has more than doubled. Average size of mill crush probably will

Table 52.--Fats and oils industries: Companies and establishments, value of shipments, and value added by manufacture, census years 1954-67

Industry and year	Companies	Establishments	Value of shipments		Value added by manufacture	
			Total	Average per establishment	Total	Average per establishment
	<u>Number</u>	<u>Number</u>	<u>Million dollars</u>	<u>Million dollars</u>	<u>Million dollars</u>	<u>Million dollars</u>
Cottonseed oil mills:						
1954	145	286	592.3	2.1	111.7	0.4
1958	125	214	420.6	2.0	63.6	.3
1963	115	188	555.2	3.0	100.8	.5
1967	91	150	405.9	2.7	65.4	.4
Soybean oil mills:						
1954	55	88	877.4	10.0	107.2	1.2
1958	66	117	1,080.8	9.2	139.6	1.2
1963	68	102	1,473.4	14.4	152.1	1.5
1967	60	102	2,148.3	21.1	215.4	2.1
Other vegetable oil mills:						
1954	N.A.	63	338.1	5.4	36.6	.6
1958	38	46	314.7	6.8	42.1	.9
1963	39	47	234.2	5.0	42.7	.9
1967	34	41	236.7	5.8	41.8	1.0
Shortening and cooking oils:						
.....	N.A.	135	1,154.2	8.6	227.8	1.7
.....	62	105	1,239.1	11.8	221.5	2.1
.....	65	115	1,324.4	11.5	264.5	2.3
.....	63	115	1,725.6	15.0	390.7	3.4

= not available.

Source: U.S. Department of the Census, Census of Manufactures, U.S. Dept. Commerce.

Table 53.--Fats and oils industries: Establishments by size of work force,
census years 1954-67

Industry and year	Total establishments	Establishments with average of--			
		1-19 employees	20-99 employees	100-499 employees	500 or more employees
		<u>Number</u>			
Cottonseed oil mills:					
1954	286	48	219	<u>1/19</u>	0
1958	214	51	151	<u>1/12</u>	0
1963	188	35	140	<u>1/13</u>	0
1967	150	38	104	<u>1/8</u>	0
Other vegetable oil mills:					
1954	51	26	19	5	1
1958	46	26	13	7	0
1963	47	25	16	6	0
1967	41	23	12	6	0
Soybean oil mills:					
1954	88	19	50	18	1
1958	117	34	66	15	2
1963	102	21	58	13	0
1967	102	24	55	22	1
Shortening and cooking oils:					
1954	135	54	34	45	2
1958	105	25	36	41	3
1963	115	29	39	43	4
1967	115	23	43	45	4

1/ Group designation is 100 and over.

Source: Bur. of the Census. Census of Manufactures, U.S. Dept. Commerce.

continue to go up during the next few years, as soybean production increases and new, more efficient mills take a larger share of the crush.

Cottonseed oil mills have also grown larger but the increase has been less than for soybean mills. Average value of product shipments per establishment rose about a third from 1954 to 1967 but average value added to products in manufacturing went up only 12 percent.

The trend toward larger but fewer establishments is expected to continue as firms strive to increase efficiency and reduce operating costs through installation of new, more efficient operating methods and techniques.

Industry Concentration

Industry concentration in oilseed milling and processing has shown a mixed pattern since the 1950's. Number of firms processing cottonseed decreased 37 percent between 1954 and 1967. Value of shipments for the four largest firms declined from 47 to 42 percent of total industry shipments. However, industry concentration of the eight largest firms rose slightly as a result of substantial growth in sales of the fifth to eighth largest firms (table 54).

Market concentration in the soybean industry, in contrast to the cottonseed industry, has increased substantially since 1958, while number of firms has decreased. In 1967, the four largest soybean processing firms accounted for 55 percent of industry shipments, compared with 40 percent in 1958.

Number of firms and concentration has changed little in the shortening and cooking oils industry since 1958. The four largest firms account for slightly more than two-fifths of industry shipments.

Technological Improvements

Table 54.--Value of shipments accounted for by the four and eight largest oilseed processors and manufacturers of end products, census years 1954-67

Industry and year	Value of shipments accounted for by--		
	4 largest companies	8 largest companies	20 largest companies
	<u>Percent</u>		
Cottonseed oil mills:			
1954	47	57	72
1958	42	54	71
1963	41	56	72
1967	42	60	80
Soybean oil mills:			
1954	41	64	89
1958	40	63	86
1963	50	70	88
1967	55	76	94
Other vegetable oil mills:			
1954	NA	NA	NA
1958	66	93	NA
1963	58	83	99
1967	56	78	99
Shortening and cooking oils:			
1954	NA	NA	NA
1958	44	69	NA
1963	42	64	92
1967	43	67	93

Note: NA = not available.

Source: Bur. of the Census. Concentration Ratios in Manufacturing, U.S. Dept. Commerce, Spec. Rpt. MC67(S)-2.1.

Other important developments closely related to industry technology and product development are increased industry interest in the use of safflower and sunflower oils in food products and development of meat analogs from oilseed proteins.

In recent years, demand for safflower oil for use in food products has grown. This demand stems primarily from the high content of polyunsaturated fatty acids and from public interest in reducing the level of saturated fat in the diet. Production and use of safflower oil more than doubled during

the 1960's. Practically all the oil is produced by a few firms in the West. Safflower oil is used mainly in production of food products, particularly soft margarines and salad and cooking oils.

Domestic commercial production of sunflower seed for its oil began in 1967 and has continued every year since then. Sunflower oil is a very high-quality edible oil. It has greater flavor stability than most competing oils and consequently is used primarily in edible oil products. Domestic markets for sunflower oil appear to be expanding faster than the supply.

In the past decade, meat analogs have been developed from oilseed protein which are similar in flavor and appearance to meats. Meat analogs are currently marketed in two forms, extruded and spun protein fibers. These products compete mainly with lower cost meat products, such as hamburger, where they can be used as extenders or replacements. Use of vegetable protein is expected to increase substantially, in future years, particularly in the institutional market.

Horizontal Integration

Economies of size and rising acquisition costs have contributed to a decrease in single-plant oilseed processing firms, particularly soybeans, and an increase in plants operated by multiplant firms. Between 1957 and 1967, number of soybean processing firms declined from 68 to 51, a reduction of 25 percent (19). All of the drops occurred in number of single-plant firms, primarily small outfits with capacities below 150 tons per day.

Multiplant soybean processing firms only increased from 11 to 12 between 1957 and 1967, but plants owned or leased by these firms rose almost 56 percent. This increase in plant numbers came from leasing (two plants), purchasing, (nine plants), and building (16 plants). In addition, purchase of existing plants from multiplant processors occurred eight times. Five plants owned by multiplant firms were dismantled. Five multiplant firms exited from the industry, and six new firms became multiplant operations during 1957-67 (19). Decentralized multiplant processing firms are attracted to areas of high soybean production and meal utilization. Plants that are strategically located for soybean supply plus demand for processed products stabilizes a firm's industry position. These plants are able to operate with a relatively low margin.

Vertical Integration

Vertical integration; that is, combining successive stages in producing, processing, and distributing products, exists in the oilseeds industry. Within the soybean processing industry, combining processing with feed manufacturing is the strongest form of such integration. This type developed mainly through firm and plant mergers, new plant construction, and diversification of existing processing facilities.

Integration and interplant relationships between soybean processors and feedmixers make possible a more economical flow of separate products and inputs, since meal-disposition costs are minimized for the processor and meal processing costs, for the feedmixer. Moreover, with this arrangement, physical movement of raw material can be reduced and activities of both oilseed processors and feedmixers can be adjusted better to supply and demand conditions.

Vertical integration is also strong among manufacturers utilizing vegetable oils. Approximately two-thirds of domestic production of vegetable oils is used in the food processing industry by manufacturers of shortening, salad and cooking oils, salad dressing, and margarine. The remainder goes into the nonfood market and the export market. Most crude vegetable oils move away from oil extraction plants for refining; and over 70 percent of refined oil is utilized for final products or further processed into final products close to the refinery. Most refining facilities are owned by edible-food manufacturers. This backward integration among shortening and margarine manufacturers stabilizes oil supply and reduces the necessity for large storage inventories. Although large oilseed processors have integrated into refining, soybean processors have not done much forward integration in manufacturing.

Future Prospects

The fats and oils industry is expected to continue the steady growth it has experienced during the past two decades. High food use of fats and oils is expected to continue and increase slightly faster than population growth. Soybean oil will remain in a strong favorable position in the edible-oils field. In addition, expanding demand for soybean meal will help stimulate production of soybeans and oil.

As discussed, major changes have occurred during the past two decades in the structure of the fats and oils industry. These resulted mainly because firms grew larger and adopted more efficient processing methods. Further development and adoption of new technologies are predicted as firms in the industry work to satisfy more effectively growing worldwide demand for oilseed products.

SUGAR AND OTHER SWEETENERS

Sweeteners used commercially in the United States consist largely of three types: (1) sugar, produced from sugarcane and sugarbeets; (2) corn or starch sweeteners, produced largely from starch in corn; and (3) noncaloric sweeteners, of which saccharin is the most common. Sugar (sucrose) is by far the most important sweetener in use, accounting for about 80 percent of the total. Consumption, however, has been increasing at a slower rate than that of the corn sweeteners and, before the ban on cyclamate use in food products, much slower than that of noncaloric sweeteners.

Sugar consumption rose about 20 percent from 1957 to 1967, while use of corn sweeteners (corn sirup and dextrose) went up 60 percent. Noncaloric sweetener consumption has apparently fallen since late in 1969, when the Food

and Drug Administration, (FDA), U.S. Department of Health, Education, and Welfare, announced the first of a series of restrictions on cyclamate use in food products.

Production, importation, and marketing of sugar in the United States is regulated by a quota system. Each year, the Secretary of Agriculture determines the country's sugar "consumption requirements." This quantity is divided among four domestic sugar producing areas and about 24 foreign countries, according to the provisions of the Sugar Act. The sum of domestic and foreign quotas always equals "consumption requirements." The power to determine the quantity of sugar to be made available to consumers carries with it the power to influence sugar prices in the United States. The Sugar Act has been administered so that prices in the United States have been continuously above those in the world market, except in a few periods of emergency when world prices rose to very high levels.

The domestic sugar industry is divided into a number of relatively separate but associated parts. These include growing of sugarcane and production of raw sugar in Hawaii, Puerto Rico, Louisiana, and Florida; conversion of raw cane sugar produced in these areas and imported from other areas into refined sugar; and growing of sugarbeets and production of refined beet sugar. Refined cane and beet sugar are very nearly identical products and complete in the marketplace for all uses of sugar. However, there are significant differences in industry structure between areas where sugarcane is grown and raw sugar produced and also between cane and beet areas.

Cane Sugar Industry

Production and Milling

Louisiana.--Sugarcane production in Louisiana since the end of World War II has been characterized by (1) a marked reduction in number of farms growing sugarcane--from 5,957 in 1948 to 1,687 in 1969; (2) a small increase in acreage; (3) about a 37-percent rise in sugar output, primarily because of increased yields; and (4) about a 75-percent decrease in man-hours of labor required to produce enough sugarcane for a 1-ton yield of sugar. The decline in man-hour requirements was largely due to increasing mechanization of farming operations which raised relative efficiency of larger farming units.

Number of factories in Louisiana processing cane fell from 59 in 1948 to 44 in 1969. With declining numbers and larger total sugar production, average production of sugar per factory increased over 80 percent during 1948-69. The two largest companies operated seven mills--four by one company and three by the other. Remaining companies operate one mill each. Judging from Government marketing allotments for recent years, the two largest companies produced about 18 percent of Louisiana's sugar crop and the next three in size, 13 percent.

Most companies operating sugar mills in Louisiana produce part of the cane they process and purchase the remainder from independent growers. Minimum of the process of administering the sugar quota law. In practice, this minimum price nearly always becomes the actual price.

Each of the multiple-mill companies and one single-mill company operate a refinery where raw sugar they produce is refined, as well as raw sugar purchased from other plants in Louisiana and raw sugar arriving at New Orleans from other domestic areas and from foreign countries. These refineries are considerably smaller than other cane sugar refineries located along the Mississippi River which process only purchased raw sugar.

Each of the multimill companies and the single-mill company with a refinery are parts of larger corporate organizations engaged in various non-sugar businesses, including building materials, petroleum, and coffee.

Florida.--Commercial sugar production in Florida became established at a much more recent date than in Louisiana. Prior to 1960, only three Florida plants processed sugarcane. Cessation of sugar imports from Cuba in 1960 was followed by a rapid development of Florida's sugar industry, and by 1967, eight companies were growing and processing sugarcane. The largest company operated two mills and accounted for more than one-third of total output. Each of the others operated one mill. At least three Florida mills belong to large corporate complexes with other sugar interests and various business enterprises outside the industry.

Only 153 farms grew sugarcane in Florida in 1967, although sugar production was approximately the same as in Louisiana, which reported 1,687 farms. Cane grown by firms owning and operating sugar mills is believed to amount to a larger proportion of total production in Florida than in Louisiana, although precise data are not available.

Puerto Rico.--In contrast to the situation in Louisiana and Florida, sugar production in Puerto Rico has declined substantially in recent years. Increasing wage rates and difficulties encountered in mechanizing the production and harvesting of sugarcane are important factors.

Number of farms growing sugarcane in Puerto Rico has decreased from a high of 19,833 in 1952-53 to 6,531 in 1968-69. Farms with 10 acres or less of sugarcane had the greatest decline in numbers, although they constituted nearly 70 percent of the total number in 1968-69. Man-hours of labor required to produce enough cane to yield 1 ton of sugar in Puerto Rico have fallen 28 percent since 1952-53. But in 1968-69, the figure was 2.7 times that for Louisiana in 1967, the next highest user of labor.

Number of mills processing sugarcane in Puerto Rico declined from 34 in 1952 to 17 in 1969. At the end of World War II, about one-third of the sugar produced in Puerto Rico was manufactured in mills owned and operated by investors in the continental United States. By 1970, companies operating these mills had all ceased their operations in Puerto Rico and had closed most of their

mills. The Government of Puerto Rico, however, had begun operating some of them, plus two or three other mills closed by private owners. In 1971, about 60 percent of Puerto Rico's sugar output was probably produced in Government-operated mills.

Hawaii.--The sugar industry in Hawaii is more highly integrated than that in any other domestic area. Most of the land on which sugarcane is grown is leased or owned by companies operating the mills. These companies are all members of a cooperative which owns and operates a cane sugar refinery in California, where most Hawaiian raw sugar is refined. As a result of these arrangements, the Hawaiian industry mostly sells refined sugar rather than raw sugar.

Hawaiian sugarcane was processed in 24 mills in 1969. With one exception they are all represented in the cooperative and many of them are owned by an agency or parent company, commonly referred to as a factor. Five factors represented all but two mills. These factors perform such functions as purchasing, accounting, and consultation on various management problems. Ownership interest in individual mills enables factors to represent mills in the cooperative. Most of these parent companies also engage in other types of business and some in sugar business in other geographic areas.

Since World War II, sugar production in Hawaii has increased slowly, but number of mills has decreased from 31 to 24. Some further reduction in mill numbers is likely in the next 2 or 3 years.

Refined Cane Sugar

Most raw cane sugar is converted to refined white sugar in separate plants called refineries. About two-thirds of raw sugar processed by refiners in 1969 was imported, one-fifth from Hawaii and Puerto Rico; the remaining 13 percent was produced in the continental United States. With only a few exceptions, refineries are located in harbors near large coastal cities so that sugar can be unloaded directly from ships to plant. These sites also provide sizable local markets for refined sugar. These cities are Boston, New York, Philadelphia, Baltimore, Savannah, New Orleans, Galveston, and San Francisco. A few small plants are located in southern Florida and at such inland points as St. Louis and Chicago. There are two refineries in Boston, four in New York, two in Philadelphia, six at New Orleans, and one each in Baltimore, Savannah, Galveston, and San Francisco.

About 28 percent of the raw sugar received in the continental United States from overseas in 1968 was unloaded at New Orleans. Most of it was refined there, but some was transferred to barges and sent to St. Louis and Chicago. In addition, most raw sugar produced in Louisiana, about 500,000 tons, was processed in New Orleans. The next largest quantity of raw sugar, about 20 percent of the total and all of it from overseas, was unloaded at New York. The four northeastern refining points of Boston, New York, Philadelphia, and Baltimore received 52 percent of all overseas shipments of raw sugar. One company received about one-half of this share.

percent was shared about equally among the Dominican Republic, Mexico, and Brazil. The remainder was imported from about 25 other countries. Besides receipts from Hawaii, most of which went to San Francisco, the rest of the sugar went to Gulf and Atlantic ports. In 1969, 15 companies were refining cane sugar in the United States. They operated 23 plants; five belonged to a complex where sugarcane is processed and raw sugar converted to refined form. The two largest refiners produced about half the refined cane sugar used in the United States.

Beet Sugar Industry

Sugarbeets were grown on about 18,400 farms in 24 States in 1969. Number of farms growing beets has declined about one-half since 1950. In 1969, sugarbeets were processed in 59 plants located in 19 States. By the end of 1971, only about 55 mills were in operation. This reduction, however, is likely to have little effect on volume of beet sugar produced, since mills ceasing operation have produced only small amounts of sugar in recent years. Mills in use in 1969 were operated by 12 companies, five of which each operated only one mill. The largest company had 17 mills.

The Western United States is a surplus sugar-producing area. Production is concentrated in California, the Pacific Northwest, Colorado, and the Red River Valley of Minnesota and North Dakota. Except for California, population in these areas is relatively sparse and much of the sugar produced must be shipped long distances to market. The Chicago area is the largest market for such sugar, although some is sent East as far as Buffalo and Pittsburgh.

According to data published by an industry trade association, the four largest companies accounted for 66 percent of total beet sugar manufactured in 1969, and the six largest, for 88 percent. Concentration of production within certain areas is much greater. One company manufactured 89 percent of sugar produced in Colorado and Nebraska and 46 percent of Montana-Wyoming output in 1969. Another processor owns all the mills in Minnesota, North Dakota, and Iowa, where 9 percent of the 1969 beet sugar crop was manufactured. Two companies own all the mills in Washington, Oregon, Idaho, and Utah. Neither company has any mills outside these States.

Few sugarbeet growers have more than one outlet for their beets. Their bargaining ability resides primarily in their membership in a beet growers association.

Starch Sweeteners

All starch sweeteners produced in the United States are manufactured from corn by the corn wet-milling industry. These products consist of dextrose and various types of corn sirup. Product differentiation among companies does not appear to be an important market factor. Prices of these products have not risen as fast as sugar prices since 1957. This slower rate, no doubt, has been a factor in the more rapid increase in use of starch sweeteners compared with sugar.

About 10 companies produce corn sirup; three also produce dextrose. Most of these companies also produce starch in various forms. Several companies producing corn sweeteners are part of diversified corporate complexes. In one case, the complex includes a cane sugar refinery. Corn sweeteners appear to be comparatively minor products for six companies.

Noncaloric Sweeteners

The principal noncaloric sweetener used since 1970 is saccharin. Cyclama was an important ingredient of food products prior to October 1969, when, as mentioned, FDA issued the first of a series of regulations restricting its use.

There are two producers of saccharin. In addition, imports have at times been important enough to provide substantial competition to domestic producers. The possibility of increasing imports appears to be an important factor limiting the market power of saccharin producers.

Market Conduct and Performance

Two aspects of the market conduct and performance of firms in the sugar industry are of particular interest. One concerns its involvement with and response to legislative mandates affecting the industry; the other involves market actions and strategy of individual firms. Manufacturers of corn sirup and dextrose are less involved with legislation than those in the sugar industry because there is no quota system for corn sweeteners.

certain classes of consumers. Sugar is a comparatively undifferentiated product and brand names, except perhaps in retail stores, are relatively important.

The increasing proportion of beet sugar in total supply available to consumers has meant that a larger share of U.S. sugar is produced in the Western States, where most sugarbeets are grown. As a result, beet sugar supplies have increased in the Midwest, particularly in Chicago, and in California relative to supplies of cane sugar. Refined cane sugar, obtained primarily from imported raw sugar, is mostly manufactured in the Northeast. Its share of total U.S. sugar supplies has declined. As a result, wholesale price of refined sugar in the Northeast has risen relative to prices in other areas. The increase since 1949 relative to prices in the Chicago-West and Pacific Coast areas has amounted to about 1 cent per pound, about 12.5 percent of the 1949 price.

These shifts have unquestionably affected volume of business and profits of individual firms. In general, these changes have not come about from activities of any individual firm but have reflected the relative success of different segments of the sugar industry in improving their quota position under the Sugar Act.

Market performance of firms producing corn sirup and dextrose appears to have been conditioned considerably by prices and practices in the sugar market. Activities of these firms are influenced by competition between these sweeteners and by the much greater consumption of sugar. Since World War II, prices of corn sirup and dextrose have declined relative to those of sugar. Lower prices for corn, the industry's principal raw material, together with an increasing volume of sales, primarily made such prices profitable.

There is no evidence of an individual firm's having sufficient market power to influence prices over any long period of time. Price leadership has sometimes been undertaken by one of the larger firms and at other times, by one of the smaller ones.

Buyer Concentration

Performance in the sweetener market is affected by volume and manner of purchases by certain large users, as well as by actions of sellers. About two-thirds of the sugar consumed in the United States is sold to food and beverage manufacturers. The proportion for corn sweeteners is considerably higher.

In 1970, use of refined sugar by major food industries and nonindustrial users, including household consumption, was:

Use	Amount	Share of total
	<u>1,000 tons</u>	<u>Percent</u>
Baking	1,469	13.8
Confectionery	1,106	10.4
Dairy	547	5.2
Beverages	2,357	22.2
Canning	928	8.7
Other industrial	508	4.8
Nonindustrial	3,706	34.9
Total	10,621	100.0

Sellers indicate that, in certain geographic areas, the relative volume of sales to large firms in each of these industries is great enough to affect the marginal cost of refining sugar. Thus, the refiner's margin is affected by the gain or loss of such an account. Firms in canning, confectionery, and dairy industries also use large quantities of corn sirup. Firms in the baking industry are large users of dextrose. The most important sugar users in the beverage industry are producers of soft drinks. Most sweeteners purchased by the dairy industry are used to manufacture ice cream and related products.

Buyers for industrial firms, particularly those using large quantities of sugar or other sweeteners, commonly purchase directly from producers. One of the companies producing soft drinks has a refinery which makes liquid sugar. The firm uses this sugar in its soft drink plants situated close enough to the refinery so that deliveries can be made at a cost no greater than for sugar purchased elsewhere.

Other companies buying large quantities of sugar are reported to use various devices, not readily available to smaller users, which they believe will enable them to obtain sugar at favorable prices. These devices include operations in the raw sugar market, either futures or spot, by which the firm in effect purchases raw sugar and arranges with a refiner to refine and deliver sugar to the user for a fee.

Extent of such operations and effect on cost of sugar to the concern using them is unknown. They do, however, provide some variety in bargaining between refiners and industrial sugar users, as well as in competition among users in attempting to obtain their sugar at the lowest possible cost.

Interaction of large buyers dealing with large sellers probably results in somewhat different prices in certain areas than would be expected to prevail under conditions of perfect competition. However, each side apparently exerts as something of a check on market power of the other.

FOOD TRADE

Many types of businesses are engaged primarily in distributing farm food products. Several types of wholesalers move products from farmers to processors and retailers. These include firms that assemble and handle raw farm products, merchant wholesalers, and agents and brokers. Retail trade consists of foodstores and away-from-home eating establishments. Foodstores include concerns that specialize in one line of items, such as meat or bakery products; convenience stores; and grocery stores. Eating places, such as restaurants and cafeterias, are the largest segment of the away-from-home market for food. In addition, food service is provided in a large number of operations, including school and college lunchrooms, military messhalls, hospitals, and airlines.

Retail foodstores comprise the largest segment of the food trade sector of food marketing industries (table 55). Bureau of the Census, U.S. Department of Commerce, enumerated 294,243 foodstores in 1967. About three-fourths of these were classified as grocery stores, including delicatessens. Eating places, the next largest group of businesses, numbered over 236,000 in 1967. All types of establishments engaged in some aspect of food wholesaling totaled about 50,000 in 1967. Number of establishments primarily engaged in food distribution totaled almost 581,000 in 1967.

The structure of food distribution has been changing in much the same way as that in food processing industries. Number of firms and establishments has declined, while average size of business has risen substantially. There also have been increases in concentration of sales among the largest firms and continued integration of wholesaling and retailing activities.

RETAIL FOODSTORES

Food retailing is one of the Nation's largest industries in number of establishment and sales; and, as such, it is the principal source of food for consumers. Foodstores account for about 17 percent of all U.S. retailing establishments, and roughly a fifth of total retail sales. Over the past couple of decades, significant structural changes have occurred in food retailing. These include a trend toward fewer and larger stores, greater concentration of sales by large firms, and growth of convenience foodstores and discount foodstores as a competitive force.

Grocery Stores

While food sales have been increasing, number of grocery stores has been declining. In 1967, there were 218,130 grocery stores, including delicatessens, sales of \$65.1 billion--11 percent fewer than in 1963 and 16 percent fewer than in 1958. A trade source estimates that since 1967, the number has declined further to around 208,000 (14). Though representing about three-fourths of all foodstores in 1967, grocery stores accounted for 93 percent of all foodstore sales. Number of other foodstores or specialty stores, such as meat markets, retail bakeries, and dairy product stores, has also been declining. In 1967, there were 76,113, about a fourth of all foodstores (table 56 and 57).

Table 55.--Food trade: Firms and establishments, sales, and employees, 1958, 1963, and 1967

Kind of business	Firms	Establishments	Sales	Employees
	Number	Number	Mil. dol.	Number
Food trade, total:				
1958	---	640,219	127,841	2,914,483
1963	---	596,797	157,356	3,341,948
1967	---	580,802	192,060	3,777,700
Percentage change, 1958-67 ..	---	-9	50	30
Wholesale trade: <u>1/</u>				
Grocery products:				
1958	N.A.	40,189	46,263	347,739
1963	N.A.	40,525	59,551	497,311
1967	N.A.	37,902	72,230	515,922
Percentage change, 1958-67 :	---	-6	56	48
Grain and livestock: <u>2/</u>				
1958	N.A.	13,471	21,315	65,427
1963	N.A.	12,963	26,807	80,652
1967	N.A.	12,094	30,699	80,616
Percentage change, 1958-67 :	---	-10	44	23
Retail trade:				
Grocery stores, including				
delicatessens:				
1958	N.A.	259,796	43,696	976,439
1963	218,615	244,838	52,566	1,080,905
1967	187,293	218,130	65,074	1,241,767
Percentage change, 1958-67 :	---	-16	49	27
Foodstores, except grocery				
stores:				
1958	N.A.	96,958	5,529	212,291
1963	65,055	74,595	4,513	193,490
1967	67,176	76,113	5,178	202,702
Percentage change, 1958-67 :	---	-21	-6	-4
Eating places:				
1958	N.A.	229,815	11,038	1,312,587
1963	208,453	223,876	13,919	1,489,590
1967	217,996	236,563	18,879	1,736,693
Percentage change, 1958-67 :	---	3	71	32

1/ Wholesale trade includes more than is suggested by the term "wholesaler." It encompasses all types of establishments selling farm food products at wholesale, including merchant wholesalers, merchandise agents and brokers, manufacturers' sales branches and offices operated apart from plants, and assemblers of farm products.

2/ Primarily county and terminal grain elevators and grain merchants; and livestock auctions, commission merchants, and concentration yards.

Note: N.A. = not available.

Source: Bur. of the Census. Census of Business: Wholesale and Retail Trade, U.S. Dept. Commerce.

Table 56.--Grocery and food stores, census years 1954-67

Year	Grocery stores			Foodstores		
	Total	Single-store firms	Multistore firms	Total	Single-store firms	Multistore firms
	<u>Number</u>					
1954	279,440	254,805	24,635	384,616	350,267	34,349
1958	259,796	234,901	24,895	355,508	322,394	33,114
1963	244,838	215,129	29,709	319,433	278,333	41,069
1967	218,130	184,489	33,641	294,243	250,297	43,946

Source: Bureau of the Census, Census of Business, U.S. Dept. Commerce.

Table 57.--Retail sales of food and grocery stores, census years 1954-67

Year	Foodstore sales	Grocery store sales			Grocery store sales as share of foodstore sales
		Single-store firms	Multistore firms	Total	
		<u>Million dollars</u>			<u>Percent</u>
1954	39,762	17,838	16,583	34,421	86.6
1958	49,225	20,557	23,140	43,696	88.8
1963	57,079	22,677	29,889	52,566	92.1
1967	70,251	25,301	39,773	65,074	

Source: Bureau of the Census, Census of Business,

Table 55.--Food trade: Firms and establishments, sales, and employees, 1958, 1963, and 1967

Kind of business	Firms	Establishments	Sales	Employees
	Number	Number	Mil. dol.	Number
Food trade, total:				
1958	---	640,219	127,841	2,914,483
1963	---	596,797	157,356	3,341,948
1967	---	580,802	192,060	3,777,700
Percentage change, 1958-67 ..	---	-9	50	30
Wholesale trade: <u>1/</u>				
Grocery products:				
1958	N.A.	40,189	46,263	347,739
1963	N.A.	40,525	59,551	497,311
1967	N.A.	37,902	72,230	515,922
Percentage change, 1958-67 :	---	-6	56	48
Grain and livestock: <u>2/</u>				
1958	N.A.	13,471	21,315	65,427
1963	N.A.	12,963	26,807	80,652
1967	N.A.	12,094	30,699	80,616
Percentage change, 1958-67 :	---	-10	44	23
Retail trade:				
Grocery stores, including				
delicatessens:				
1958	N.A.	259,796	43,696	976,439
1963	218,615	244,838	52,566	1,080,905
1967	187,293	218,130	65,074	1,241,767
Percentage change, 1958-67 :	---	-16	49	27
Foodstores, except grocery				
stores:				
1958	N.A.	96,958	5,529	212,291
1963	65,055	74,595	4,513	193,490
1967	67,176	76,113	5,178	202,702
Percentage change, 1958-67 :	---	-21	-6	-4
Eating places:				
1958	N.A.	229,815	11,038	1,312,587
1963	208,453	223,876	13,919	1,489,590
1967	217,996	236,563	18,879	1,736,693
Percentage change, 1958-67 :	---	3	71	32

1/ Wholesale trade includes more than is suggested by the term "wholesaler." It encompasses all types of establishments selling farm food products at wholesale, including merchant wholesalers, merchandise agents and brokers, manufacturers' sales branches and offices operated apart from plants, and assemblers of farm products.

2/ Primarily county and terminal grain elevators and grain merchants; and livestock auctions, commission merchants, and concentration yards.

Note: N.A. = not available.

Source: Bur. of the Census. Census of Business: Wholesale and Retail Trade, U.S. Dept. Commerce.

Table 56.--Grocery and food stores, census years 1954-67

Year	Grocery stores			Foodstores		
	Total	Single-store firms	Multistore firms	Total	Single-store firms	Multistore firms
1954	279,440	254,805	24,635	384,616	350,267	34,349
1958	259,796	234,901	24,895	355,508	322,394	33,114
1963	244,838	215,129	29,709	319,433	278,333	41,069
1967	218,130	184,489	33,641	294,243	250,297	43,946

Source: Bureau of the Census, Census of Business, U.S. Dept. Commerce.

Table 57.--Retail sales of food and grocery stores, census years 1954-67

Year	Foodstore sales	Grocery store sales			Grocery store sales as share of foodstore sales
		Single-store firms	Multistore firms	Total	
		<u>Million dollars</u>			<u>Percent</u>
1954	39,762	17,838	16,583	34,421	86.6
1958	49,225	20,557	23,140	43,696	88.8
1963	57,079	22,677	29,889	52,566	92.1
1967	70,251	25,301	39,773	65,074	92.6

Source: Bureau of the Census, Census of Business, U.S. Dept. Commerce.

Practically all of the decrease in grocery stores has occurred among single-store firms; numbers fell from 215,000 in 1963 to nearly 185,000 in 1967. In contrast, number of stores operated by multiunit retailers has increased. For example, number of stores operated by firms with 101 or more units rose 25 percent between 1963 and 1967 (table 58).

Table 58.--Grocery stores operated, by size of firm, census years 1963-67

Stores per firm	1963		1967	
	Firms	Stores	Firms	Stores
	----- <u>Number</u> -----			
One	215,129	215,129	184,489	184,489
Two	2,238	4,297	1,541	3,061
Three	465	1,334	417	1,238
Four-five	306	1,254	313	1,323
Six-10	219	1,535	234	1,722
11-25	145	2,097	161	2,479
26-50	49	1,422	67	2,120
51-100	32	2,065	32	2,043
101 or more	32	15,705	39	19,655

Source: Bur. of the Census, Census of Business, U.S. Dept. Commerce.

Much of the decrease in single-store numbers and their corresponding loss in market share has resulted from replacement of small stores by supermarkets. Single-store retailers' share of grocery store sales declined from 52 percent in 1954 to 39 percent in 1967. Multistore retailers' share of the market increased, particularly for firms operating 51 or more stores (table 59).

Though number of stores has declined as many small stores have disappeared, average size of store has grown considerably larger. Sales per grocery store averaged almost \$300,000 in 1967, compared with \$215,000 in 1963. Average sales per store varied widely between single-unit and multiunit firms. In 1967, sales of single-unit firms, which make up roughly four-fifths of all grocery stores, averaged only \$137,000, while sales per store of multiunit firms averaged almost \$1.2 million.

In store size, supermarkets--stores with \$500,000 or more in sales per year--account for most sales. Though they represent only about 15 percent of total number of grocery stores, supermarkets now make three-fourths of total sales. Moreover, most sales are concentrated in supermarkets with annual sales of \$1 million or more. These stores numbered about 19,000 in 1967, only 9 percent of all grocery stores, but representing 61 percent of sales (table 60).

Table 59.--Shares of total grocery store sales, by size of firm, 1954-67

Size of firm	1954	1958	1963	Percent
Stores:				
1	51.8	47.0	43.1	
2 or 3	4.8	4.8	5.0	
4 or 5	1.6	1.9	1.9	
6-10	2.4	2.4	2.9	
11-25	3.6	3.3	4.2	
26-50	4.0	4.4	3.2	
51-100	2.4	4.0	5.2	
101 or more	29.4	32.2	34.5	
Total	100.0	100.0	100.0	

Source: Bur. of the Census, Census of Business, U.S. Dept. Commerce.

Table 60.--Distribution of number and sales of grocery stores, by annual sales size of store, census years 1954-67

Annual sales size of store	Grocery stores in--			
	1954	1958	1963	1967
	Percent			
Under \$100,000	76.8	72.4	66.9	61.0
\$100,000 to \$299,000 ..	15.1	16.2	17.5	19.7
\$300,000 to \$499,000 ..	2.9	3.4	4.1	4.6
\$500,000 to \$999,000 ..	2.8	3.7	5.0	5.5
\$1 million and over ...	2.4	4.3	6.5	9.1
Total	100.0	100.0	100.0	100.0
	Grocery store sales in--			
	1954	1958	1963	1967
	Percent			
Under \$100,000	22.4	15.3	11.2	8.2
\$100,000 to \$299,000 ..	19.8	15.7	12.9	10.9
\$300,000 to \$499,000 ..	9.1	7.8	7.0	6.0
\$500,000 to \$999,000 ..	16.1	15.7	16.1	13.5
\$1 million and over ...	32.6	45.5	52.8	61.3
Total	100.0	100.0	100.0	100.0

Source: Bur. of the Census; Census of Business, U.S. Dept. Commerce.

As grocery store sales have become more concentrated among multiunit firms, the market share of the 20 largest chains also has increased (table 61). From 1954 to 1970, the market share of the 20 largest chains rose 10 percentage points. All growth has been among the fifth to 20th largest firms. Market share of the four largest firms has remained relatively stable, mainly because sales of the largest of the four did not grow as fast as did total market sales during most of 1954-70.

Table 61.--Market share of 20 leading grocery chains, selected years, 1954-70

Chains	Share of total grocery store sales in--					
	1954	1958	1963	1967	1969	1970
	Percent					
1st-4th largest ...	20.9	21.7	20.0	20.0	20.5	20.1
5th-8th largest ...	4.5	5.8	6.6	7.2	8.0	8.1
1st-8th largest ...	25.4	27.5	26.6	27.2	28.5	28.2
9th-20th largest ..	4.5	6.6	7.4	9.8	11.5	11.8
1st-20th largest ..	29.9	34.1	34.0	37.0	40.0	40.0

Source: National Commission on Food Marketing, Organization and Competition in Food Retailing, June 1966; estimates for 1967, 1969, and 1970 were computed from sales of food chains, and total sales of grocery stores reported by Bureau of the Census, Census of Business Retail Trade and Annual Retail Trade Reports.

Most chains operate their own warehouses and have integrated the wholesaling and retailing functions. To compete more effectively with chains, many independent retailers have associated themselves with wholesale suppliers to take advantage of large-scale buying and merchandising. Retailers who have created wholesale units to supply themselves with merchandise and wholesaler-sponsored voluntary retail groups are termed affiliated independents.

Affiliated independents represented about one-third of all grocery stores and 45 percent of grocery store sales in 1970 (14). Affiliates' share of the market remained relatively stable during the 1960's. Most of their growth occurred in the 1950's, as increasing numbers of independent stores shifted from unaffiliated to affiliated status. Unaffiliated independents represent about half of all grocery stores but account for less than 10 percent of grocery store sales.

Convenience Stores

A relatively new, but fast-growing type of foodstore is the convenience store. Its appeal, as the name implies, is based on convenience of location, quick service, and long store hours. Such attributes have enabled these stores to compete with supermarkets despite somewhat higher margins and prices and a more limited brand selection.

Number of convenience stores has grown dramatically over the past decade. In 1970, there were 13,250, compared with 5,000 in 1965 and only 2,500 in 1960 (14). This type of store is most prevalent in the South but it has also spread into other parts of the country. Opportunity for further expansion is rated very good, particularly in Northern States.

Sales of convenience stores totaled \$2.6 billion in 1970 and accounted for 3 percent of total U.S. grocery sales. Sales were only \$720 million in 1965 and the market share was 1.1 percent.

Ownership of convenience stores is highly concentrated. The leading firm operates about a third of all these stores. Firms operating 11 or more units account for ownership of roughly three-fourths of all convenience stores. Success of these stores has prompted some firms operating supermarkets to enter the convenience food market.

The majority of convenience stores are members of retailer-owned cooperative wholesale groups or voluntary wholesale groups and therefore do not operate their own warehouses. The average convenience store stocks 3,200 products, less than half the number in the average supermarket.

Discount Stores

Another relatively recent and fast-growing element in food retailing is the discount foodstore. There are two basic types--food departments of general merchandise discount stores and free-standing discount supermarkets. A trade publication estimates that food departments associated with discount stores had sales of \$5.2 billion in 1969, up from \$3.4 billion in 1965. Their sales were roughly 7 percent as large as grocery store sales in 1969. Thus, they have become a significant factor in the market. Two-fifths of all general merchandise discount stores had food departments, although nearly all those were leased (11).

Free-standing discount stores are typically units converted from conventional supermarkets in that they are larger and carry a limited line of products, mainly fast turnover items. Food discounting has increased greatly in the past several years as inflationary pressures in the economy have driven food prices higher. Both chain and independent stores have adopted discounting policies extensively but independents have done so more slowly. Trade sources report that 70 percent of food chain companies and a third of chain stores operated on a discount basis in 1970.

Specialty Foodstores

Foodstores other than grocery stores include meat and seafood markets, fruit and vegetable markets, dairy product stores, and retail bakeries. Their number amounted to about one-fourth of total retail foodstores in 1967, roughly the same proportion as in 1958. Sales of specialty foodstores were \$5.2 billion in 1967, or only 7 percent of total foodstore sales. Between 1958 and 1967, sales of such stores declined slightly, while total foodstore sales rose 43 percent. Specialized stores are mostly small and independently operated.

Foodstore Mergers and Acquisitions

Mergers and acquisitions have had a significant role in changing the structure of food retailing. For example, without the mergers of the 1950's and early 1960's in grocery retailing, the national market share of the four largest chains would have declined. Also, no significant increase would have occurred in 1963 in the market share held by the 20 largest food chains (12, pp. 103, 117).

According to data compiled by the FTC, the merger pace of the 20 largest food chains has decreased sharply since 1964. Between 1949 and 1964, the 20 largest chains accounted for nearly 70 percent of sales of all acquired firms. In 1965, acquisitions by the top 20 amounted to only 10 percent of sales of acquired firms, and by 1968 had declined to 6 percent (7). Much of this dramatic decline is attributed to merger enforcement activity of the FTC, including legal action against several large supermarket chains and identification of type or size of mergers likely to be challenged (8).

Between 1959 and 1967, an estimated 423 mergers and acquisitions occurred in the retail grocery industry, an average of 47 per year. These figures represented nearly a 50-percent decline from the annual rate of merger activity between 1952 and 1958 (17). Number of mergers declined sharply in 1969-70, attributable in part to the falling stock market and high interest rates (16).

WHOLESALE TRADE

Food wholesaling consists of four major segments, classified according to type of operation: merchant wholesalers, manufacturers' sales branches and offices, agents and brokers, and assemblers. Merchant wholesalers, who sell primarily to food retailers and food service outlets, are the most important segment, both in sales and number of establishments.

Although grocery retailers, particularly medium-sized and large chains, have integrated extensively into wholesaling during the past several decades, merchant wholesalers remain very important in the marketing of grocery products. Sales gains of merchant wholesalers carrying a general line of grocery products have tended to parallel retail sales gains. When grocery retailers began to integrate, many merchant wholesalers protected their market position by affiliating with their retail customers. Sales of affiliated grocery wholesalers--those sponsoring voluntary groups of retailers and those cooperatively

Other segments of the wholesaling structure also have undergone changes in the past decade. Numbers of agents and brokers, and manufacturers' sales branches and offices have changed little but sales have increased. In contrast, number of assemblers of farm products has dropped sharply, as more direct buying by processors and retailers of poultry and eggs, and fresh fruits and vegetables lessened the need for country assembly points.

Merchant Wholesalers

Merchant wholesalers buy and sell merchandise on their own account. There are basically two types: general-line wholesalers who carry a general line of groceries, and specialty wholesalers who specialize in a commodity line. Specialty wholesalers are the larger of the two, both in sales and number of establishments, although sales per establishment of most specialty wholesalers are much smaller than those of general-line wholesalers.

Sales of general-line wholesalers more than doubled from 1954 to 1967. Number of establishments declined but all of the decrease occurred between 1954 and 1958. Affiliated grocery wholesalers are the fastest growing segment of general-line grocery wholesaling. Between 1954 and 1967, sales nearly tripled to a total of \$11.5 billion and establishments increased 18 percent to a total of 907 (table 62). Sales of affiliated grocery wholesalers have further risen about a third since 1967 and accounted for about four-fifths of total sales of general-line grocery wholesalers in 1970.

Sales of affiliated wholesalers have become increasingly concentrated among the largest groups. The eight largest voluntary wholesale groups' share of general-line grocery sales has more than doubled, from about 12 percent in 1958 to 27 percent in 1970 (table 63). The eight largest retailer-cooperatives increased their share from about 11 to 19 percent during the same period. Growth of both types of affiliated wholesalers was due to (1) expanding product lines, (2) requiring member stores to buy their line completely, and (3) expanding institutional accounts.

Affiliation with retailers affords the wholesaler a relatively stable base of customers. The affiliated wholesaler often provides the retailer with a full line of merchandise, as well as promotional support, and assistance in store operations. Many large affiliated wholesalers provide member stores access to electronic data processing (EDP) facilities for inventory control product movement, payroll, and other store operations.

Table 62.--General line merchant wholesalers, by type of business, census years 1954-67

Type of business	1954	1958	1963	1967
	<u>Number</u>			
Establishments:				
Groceries, general-line . . .	3,320	2,253	2,530	2,543
Affiliated	767	673	869	907
Voluntary	574	N.A.	708	734
Cooperatives	193	N.A.	161	173
Nonaffiliated	2,553	1,580	1,661	1,636
	<u>Million dollars</u>			
Sales of--				
Groceries, general-line . . .	7,354	8,428	11,723	15,548
Affiliated	3,762	5,236	8,270	11,470
Voluntary	2,464	N.A.	5,357	7,367
Cooperatives	1,298	N.A.	2,913	4,103
Nonaffiliated	3,592	3,192	3,453	4,078

Note: N.A.= not available.

Source: U.S. Dept. Commerce. Census of Business.

Table 63.--General-line wholesale grocery sales, selected years, 1958-70

Wholesalers	Share of sales in--			
	1958	1963	1967	1970
	<u>Percent</u>			
Affiliated:				
Voluntary groups:				
4 largest	7.4	9.7	N.A.	18.0
8 largest	11.8	13.6	N.A.	27.3
All voluntary	38.5	45.7	47.4	48.2
Retailer-cooperatives:				
4 largest	7.9	8.5	N.A.	12.7
8 largest	10.6	12.4	N.A.	18.9
All cooperatives	25.4	24.8	26.4	30.5
Independents	36.1	29.5	26.2	21.3
Total	100.0	100.0	100.0	100.0

Note: N.A.= not available.

Source: Data for 1958 and 1963 are from National Commission on Food Marketing, Food Retailers. Study 7, app. table 17. The 1967 data are from the 1967 Census of Business, Wholesale Trade. A listing of the 8 largest voluntary groups and retailer cooperatives were not available. Data for 1970 came from information in Progressive Grocer, Apr. 1971.

sales to foodstores. In 1967, 28 percent of sales were made to industrial users, compared with 7 percent in 1958. Nonaffiliated wholesalers' share of total general-line wholesaler sales declined from 36 percent in 1958 to 21 percent in 1967.

Specialty wholesalers, numbering over 24,000, represent about 90 percent of total merchant wholesalers handling grocery products in 1967, 5 percent less than in 1958, but about the same share as in 1954 (table 64). Specialty wholesalers have substantially increased sales to the expanding away-from-home market during the past decade. While total dollar sales rose 55 percent between 1958 and 1967, sales to restaurants and other institutional customers tripled. Sales to foodstores went up only about a fourth because of intensified competition from affiliated general-line wholesalers.

Dollar sales of grain merchants and number of establishments they operated more than doubled between 1958 and 1967. Grain merchants include terminal elevators and other types of merchants marketing grain. In 1967, grain merchants made about two-fifths of their sales for export, up from a fourth in 1954.

Manufacturers' Sales Branches and Offices

Manufacturers' sales branches and offices are establishments' manufacturing companies maintained apart from their plants for marketing their products at wholesale. The two types of establishments differ in that sales offices, unlike sales branches, do not stock merchandise for delivery to customers. Total number of manufacturers' sales branches and offices was about the same in 1967 as in 1954. Sales, however, increased substantially in this period, although most of the increase occurred after 1958. Dairy manufacturing firms operate the largest number of sales branches and offices, followed by meatpackers.

Table 64. Wholesale grocery, grain, and livestock trade: Establishments and sales, by type of business, census years 1954-67

Type of business	1954	1958	1963	1967
	<u>Number</u>			
Establishments:				
Merchant wholesalers:				
Grocery products	27,494	27,977	27,856	26,997
General-line	3,320	2,253	2,530	2,543
Specialty	24,174	25,744	25,326	24,454
Grain	975	1,693	1,427	2,013
Livestock	669	635	463	563
Manufacturers' sales branches and offices:				
Grocery products	4,231	3,591	4,277	4,283
Merchandise agents and brokers:				
Grocery products	4,141	4,473	4,434	4,353
Grain	230	357	253	207
Livestock	2,223	2,246	1,997	1,734
Assemblers:				
Grocery products	4,080	4,148	3,958	2,269
Grain	6,613	7,229	7,586	6,477
Livestock	1,090	1,311	1,237	1,100
	<u>Million dollars</u>			
Sales by--				
Merchant wholesalers:				
Grocery products	19,798	23,357	30,598	39,469
General-line	7,354	8,428	11,723	15,548
Specialty	12,444	14,929	18,875	23,921
Grain	3,990	5,073	8,781	11,499
Livestock	888	759	639	836
Manufacturers' sales branches and offices:				
Grocery products	8,960	9,677	12,599	15,044
Merchandise agents and brokers:				
Grocery products	8,687	10,675	13,746	15,809
Grain	1,129	1,108	2,228	1,656
Livestock	7,558	8,936	8,811	9,531
Assemblers:				
Grocery products	2,680	2,554	2,608	1,908
Grain	3,226	3,317	4,952	5,591
Livestock	1,771	2,122	1,396	1,586

Source: Bur. of the Census. Census of Business and Wholesale Trade, U.S. Dept. Commerce.

Total number of establishments operated by assemblers of farm food products changed little between 1954 and 1963, but declined almost one-fourth from 1963 to 1967. Assemblers of fresh fruits and vegetables and poultry had over four-fifths of total grocery product assemblers, 50 percent fewer establishments in 1967 than in 1963. Dollar sales also dropped sharply. Country grain elevators, roughly two-thirds of all assemblers of farm products, declined around 15 percent in 1967 from a high of nearly 7,600 in 1963. Dollar sales, however, totaled more in 1967, reflecting a growth in volume marketed.

Changes in production and marketing practices probably were the major cause of the decrease in number of assemblers. Increased specialization and integration in poultry production have reduced the need for assemblers services, since specialized poultry producers, who have thousands of birds, generally sell directly to a processing plant. Decrease in number of fresh fruit and vegetable assemblers probably resulted in part from increased direct buying by chainstores.

FOOD SERVICE

The foodservice industry, consisting of more than 500,000 mass feeding outlets, represents a major market for food produced by the Nation's farms. It also is a substantial market for foodservice equipment and other supplies and services, as well as a major employer of labor.

In 1969, retail value of food and nonalcoholic beverages consumed away from home was estimated at \$35 billion. Cost to operators was valued at \$16 billion. The significance of this market is apparent when compared with total value of food consumed--\$115 billion, or \$567 per person in 1969. ^{4/} Retail value of food moving through foodservice outlets was equal to \$172 per person, or a little less than one out of every three dollars.

Number and Type of Establishments

Kinds of businesses that comprise the industry may be classified into two basic sectors--public and institutional. Public businesses exist primarily to sell a product or service for profit. Public food service may be provided as a subordinate facility, such as a drugstore soda fountain or bowling alley snackbar; or as the major kind of business, such as separate eating places. Separate eating places derive most revenue from the sale of prepared meals and snacks.

In 1966, there were 202,000 separate eating places in the 48 contiguous States. Separate drinking places comprised the next largest segment in the public sector, numbering almost 52,000. They were followed by retail stores,

^{4/} Includes personal food expenditures; nonpersonal food expenditures, such as business purchase of meals; and estimated value of food donated by Government agencies to schools and needy persons.

recreation and amusement places, hotels and motels, and drugstores. The public sector had about 142,000 establishments in which the sale of meals and snacks was not the primary source of revenue. Consequently, this part of the market sometimes may be overlooked in analyzing the magnitude of the foodservice industry.

In the institutional sector, the primary purpose of such businesses as universities, sanatoriums, and homes for children is rendering a nonprofit service. Food service in institutions is usually supportive. Schools and colleges are by far the largest segment in the institutional sector. About 79,000 establishments in this group provided food service in 1966. Food service was also included in over 11,000 hospitals, sanatoriums, and rest homes. Data on number of establishments associated with the military services are not available but these operations account for a substantial volume of food used.

Value of Food

Retail value of food and nonalcoholic beverages moving through the away-from-home market in 1969 was estimated at nearly \$35 billion. Of this, establishments in the public sector accounted for \$24 billion, or 70 percent of total value. Separate eating places alone accounted for more than \$16 billion (table 65).

Value of food served in establishments in the institutional sector amounted to about \$10.5 billion, roughly a third of total value of all food served away from home. Schools and colleges and the military services represented major markets for food in this sector.

The year's food costs of all businesses were estimated at \$16 billion for 1969. Although most food purchases were made at wholesale, some items were purchased at other distribution levels, including retail. Establishments in the institutional sector accounted for about a third of total value of foods purchased. Next to separate eating places, schools constitute the second largest market for food, with about 13 percent of total volume.

Establishment Characteristics

Survey results show the importance of larger eating places as outlets for agricultural products (18). ^{5/} For example, 14 percent of all establishments surveyed accounted for nearly three-fifths of retail value of food served; 30 percent accounted for more than three-fourths of value. Public foodservice operations were also found to be smaller, on the average, than institutional food services. Value of food served in public eating places averaged about \$53,900 a year in 1966, whereas institutions averaged \$123,000.

^{5/} The survey did not include food operations connected with the military services, elementary and secondary schools, Federal hospitals, correctional institutions, commercial passenger carriers, and boardinghouses.

Table 65.--Establishments with food service, and retail and purchase value of food and nonalcoholic beverages received, by kind of business, 1969

Kind of business	Establishments	Retail value	Cost of food purchased
	<u>No. 1/</u>	<u>Mil. dol.</u>	<u>Mil. dol.</u>
Public sector:			
Separate eating places	201,734	16,367.7	7,185.4
Separate drinking places	51,646	1,188.7	555.1
Drug or proprietary stores	12,013	350.0	154.7
Retail stores	22,820	1,149.7	493.2
Hotels, motels, or tourist courts	16,558	1,636.9	723.5
Recreation or amusement places	19,411	897.1	399.2
Civic, social, or fraternal associations	4,355	176.3	69.3
Factories, plants, or mills	6,784	772.0	394.5
Intransit food service	2/	813.0	406.0
Other public establishments	8,429	676.7	281.5
Subtotal	---	24,028.1	10,662.4
Institutional sector:			
Hospitals	6,338	1,506.6	723.1
Sanatoriums, convalescent, or rest homes	5,118	247.3	119.2
Homes for children, aged, handicapped, or mentally ill	4,092	399.3	184.1
Schools and colleges	79,175	4,606.8	2,235.9
Military service	2/	3,135.0	1,568.0
Correctional institutions	2/	116.0	58.0
Other institutional establishments	15,043	471.2	215.4
Subtotal	---	10,482.2	5,112.7
Total	---	34,510.3	15,775.1

1/ Estimated for 1966.

2/ Not available.

Source: Van Dress, Michael G., and William H. Freund. The Food Service Industry: Its Structure and Characteristics. Econ. Res. Serv., U.S. Dept. Agr., Stat. Bul. 416, Feb. 1968; and Van Dress, Michael G. The Foodservice Industry: Type, Quantity, and Value of Foods Used. Econ. Res. Serv., U.S. Dept. Agr., Stat. Bul. 476, Nov. 1971; and unpublished material.

A high proportion of separate eating places are individually owned and operated. Changes in their ownership and location are quite prevalent because of poor location, rising costs, lack of managerial competence, and increased competition. In the 1966 survey, it was found that 21 percent of separate eating places had been operated by the same owner at the same location for less than 1 year, and that only 44 percent had been operated for at least 5 years. In contrast to separate eating places, 62 percent or more of eating places in retail stores; hotels, motels, or tourist courts; factories, plants, or mills; and civic, social, or fraternal associations had been in business 5 years or more at the same location.

About four-fifths of more than 200,000 separate eating places had table or booth service available for patrons. This service was the primary type for about half these establishments. Counter service was the primary type for about a fourth of the establishments, although this service was offered in the majority of separate eating places. Drive-in service was available in nearly 33,000 separate eating places and was the primary type in about 25,000 establishments.

Location of eating places varied by primary type of food service. The 1966 survey revealed that about 80 percent of all separate eating places were located in cities, 10 percent in suburbs, and 10 percent in rural areas. By type of food service, however, nearly 88 percent primarily offering counter or cafeteria service were located within city limits, compared with 73 percent of establishments primarily offering drive-in service.

Vending machines became more important as a type of food service during the 1960's. Factories, plants, and mills had more vending machines than any other kind of business. Hospitals and colleges were next. About one in four machines in foodservice outlets vended soft drinks; one in five, candy and packaged confections; and one in 10, coffee, tea, and cocoa.

Source of Food Supply

Institutional middlemen offering two or more product lines are by far the principal suppliers of the foodservice industry. In 1969, they handled about 52 percent of dollar value of all food transactions involving primary suppliers. Multiple-line middlemen handle food items from two or more major food groups, such as dairy products and bakery products; in contrast, special middlemen offer only a single line of products, such as fresh fruits and vegetables. Next in importance as primary suppliers were single-line institutional middlemen, who handled 17 percent of the value of all transactions involving primary suppliers in 1969. Following close behind with 11 percent were multiple-line foodstore middlemen. Altogether, middlemen accounted for 85 percent of dollar value of transactions.

Retail foodstores, though the principal source of supply for 18 percent of establishments, accounted for only 6 percent of dollar value of transactions. Conversely, parent enterprises and commissaries were the principal source for a very small proportion of establishments but accounted for 6 percent of the value of transactions.

Important changes are likely in purchasing practices of foodservice operations and in operations of their suppliers in the 1970's. These changes will affect operational size of establishments, inventory practices, and number and types of food products handled.

Land and facility costs are pressing foodservice operators to utilize as much total establishment space as possible for accommodating customers. As new establishments are erected and older ones remodeled, space previously available for storage is being reduced. Consequently, suppliers will be forced to maintain stocks formerly held by foodservice operators. This action may, in turn, effect an increase both in number of deliveries to foodservice outlets and in delivery costs.

As cost pressures mount, suppliers may attempt to offer more products and increase average order size to offset costs associated with the rise in number of deliveries. As competition continues and the struggle for market shares intensifies, suppliers will probably add to the number of product lines handled, as well as to the basic line(s) handled. Many may become suppliers that offer "one-stop shopping."

Another factor that will probably affect purchasing practices and supply sources is the growth of multiunit foodservice operations. Dollar sales and number of units of multiunit firms have been increasing since 1948. Their share of the market has also been expanding. Although commissaries are principal suppliers of only a very small proportion of establishments, they represent 6 percent of the value of all transactions. Since a multiunit operation is more likely to have a commissary as number of member units in an area increase, parent enterprises and commissaries will likely become more prominent in the 1970's.

Sources of supply for commissary-type operations are not fully known. Retail history of distribution suggests, however, that direct purchasing will become increasingly important as a source of supply, as number and size of commissaries increase.

Growth and Prospective Changes

The market for food away from home has gained an increasing portion of the consumer's food dollar in the past decade. An indication of the growth occurring in this industry is found in the sales performance of establishments that are primarily eating places. Census data show that their sales nearly doubled between 1960 and 1970--in constant dollars (1957-59=100), sales increased about a third. For the same period, grocery store sales, excluding nonfoods, rose less--46 percent in current dollars and 15 percent in constant dollars. Whereas sales of food in grocery stores increased 1.2 times as fast as the rate of population growth, sales by eating places rose 2.6 times as fast.

Growth in sales of eating places has been accompanied by an increase in the importance of eating places with \$300,000 or more in annual sales and a decline in the importance of very small eating places. Establishments

with \$300,000 or more in annual sales made 36 percent of all eating place sales in 1967, up from 28 percent in 1963 and 20 percent in 1954. Between 1958 and 1967, number of establishments with less than \$50,000 annual sales declined, a trend that will probably continue in this decade.

The foodservice industry is dominated by single-unit firms. Although multiunit firms have been growing in importance, single units accounted for over four-fifths of total eating place sales between 1954 and 1963 (table 66). By 1967, however, their share had dropped to 77 percent. Multiunit firms with 11 or more establishments captured much of the single units' loss in market share between 1954 and 1963. The trend continued during 1963-67, when the percentage increase in sales of eating places operated by firms with 11 or more units almost doubled that of all eating places. In 1967, firms with 11 or more units represented only 5 percent of all eating places, but accounted for almost 14 percent of sales.

Table 66.--Eating places: Distribution of establishments and sales, by size of firm, census years 1954-67

Number of units	Establishments			
	1954	1958	1963	1967
	Percent			
Single	92.9	92.2	90.8	90.4
Two or three	3.3	3.4	4.0	3.0
Four to 10	1.0	1.1	1.4	1.6
11 or more	2.7	3.3	3.8	5.1
Total	100.0	100.0	100.0	100.0
	Sales			
	Percent			
Single	83.4	82.8	80.4	77.4
Two or three	5.5	5.8	5.8	5.3
Four to 10	2.6	2.7	2.9	3.7
11 or more	8.5	8.8	11.0	13.6
Total	100.0	100.0	100.0	100.0

Source: Bur. of the Census, Census of Business, Retail Trade Single Units and Multi-units, U.S. Dept. Commerce.

After rising during most of the 1950's, number of eating places declined slightly between 1958 and 1963. In 1958-63, constant dollar sales per eating place increased, following a period of little change. In 1963-67, number of eating places rose 5.7 percent. Constant dollar sales per establishment also went up significantly.

Rising prices, growing population, and more consumer purchasing power should increase total dollar sales in eating places. Additionally, eating places are well suited to continue taking advantage of changes in American living styles, including increases in mobility and vacationing. Other changes favoring continued growth of eating places are (1) the rise in number of working wives who have less time to prepare meals at home, (2) the rise in number of older people less able to cook at home, less likely to save, and more likely to enjoy eating out, and (3) the increase in college students often without facilities, inclination, or time to cook for themselves and (4) the rise in number of teenagers frequenting snack shops and hamburger stands. All these trends appear likely to continue and the outlook for eating places is bright.

TRANSPORTATION

Agricultural production occurs in practically all areas of the United States, but much of the population and industry utilizing this production is concentrated geographically. Railroads, highways, waterways, and airways link agricultural areas and population centers.

Relative importance of different modes of transport and changes over time are significant elements of the structure of the transportation industry. Most of its firms specialize in one mode, such as trucking. Thus, traffic shifts among modes occur in response to rate and service competition, rather than through substitution of one mode for another within individual transportation firms. Such a substitution tends to lessen competition.

Another significant element is that shippers may provide their own highway or waterway transportation. Many shippers are capable of reasonably efficient private trucking, and larger ones can provide reasonably efficient water transport. Dependence on for-hire transportation is thereby reduced.

Table 67.--Rail freight tonnage, farm output, and industrial production,
1954-69 (Index 1967 = 100)

Year	Farm product traffic <u>1/</u>	Farm output <u>2/</u>	All carload traffic except farm products <u>3/</u>	Industrial production <u>4/</u>		
	<u>1,000 tons</u>		<u>1,000 tons</u>			
1954 ...	110,971	90	79	1,106,034	86	54
1955 ...	112,692	92	81	1,276,654	99	61
1956 ...	116,504	95	82	1,324,433	103	63
1957 ...	115,014	94	81	1,259,870	98	63
1958 ...	123,218	100	86	1,062,733	83	59
1959 ...	120,304	98	87	1,107,974	86	67
1960 ...	124,205	101	90	1,113,235	87	69
1961 ...	126,572	103	91	1,064,582	83	70
1962 ...	127,103	103	92	1,104,312	86	75
1963 ...	131,027	107	95	1,152,142	90	78
1964 ...	131,432	107	94	1,221,685	95	84
1965 ...	130,476	106	97	1,255,614	98	91
1966 ...	144,586	118	96	1,303,266	102	99
1967 ...	123,008	100	100	1,283,660	100	100
1968 ...	115,965	94	102	1,314,476	102	105
1969 ...	119,291	97	103	1,353,329	105	109

1/ Interstate Commerce Commission, Freight Commodity Statistics, Class I Railroads in the United States. Includes only those products listed under Farm Products.

2/ Gross production of livestock and crops.

3/ Interstate Commerce Commission, Freight Commodity Statistics, Class I Railroads in the United States. Includes all carload traffic except Farm Products.

4/ Federal Reserve Board index of quantity output.

Over 400 railroads operate more than 200,000 miles of line throughout the United States. Most of the line is owned or leased by Class I railroads (annual revenues of \$5 million or more). There were 91 Class I railroads in 1959, and 71 in 1969.

Access of railroads to geographic points at which they provide service is limited by their rights-of-way and tracks, but shippers at other points can use highway vehicles in combination with railroads for through hauls. The Interstate Commerce Act requires all railroads to cooperate in establishment of through routes and joint rates; thus, in many respects, one railroad system serves the entire country.

of firms may, therefore, be less significant to performance than is true in unregulated industries. However, one aspect of railroad performance that has been a source of continuing concern is maintaining an adequate fleet of railcars and properly deploying those cars to meet shippers' needs. Agricultural shippers have suffered car shortages cyclically and seasonally for many commodities. Grain and fruit and vegetable shippers seem to have experienced shortages most persistently, although cotton and other commodity shippers have had some shortages.

Investment analysis in the late 1950's showed that per diem rates then in effect did not adequately reimburse railroads owning cars for use of these cars by other railroads. Nor were these rates designed to encourage either addition of high-cost cars to interchange fleets or deployment in a timely manner of empty cars to railroads with the greatest need for cars. Most research, legislation, and other actions on car supply problems occurring since the late 1950's have been addressed to one or more of these three problems. However, they are too complex for easy solutions and will probably continue to appear.

Trucks

Trucks came into widespread use in moving agricultural products from farms to railroad loading points and for distributing products in consuming centers following World War I. By the 1930's, trucks had begun to compete vigorously for traffic formerly moving by rail. Growth of truck transport in relation to other modes for all types of traffic since 1950 is shown in table 68.

Trucks provide a preferred service for many agricultural shippers. By the mid-1950's, practically all eggs, milk, ice-packed broilers, and some other perishables were transported by trucks, according to receipts, unload reports, or both, of the Federal-State Market News Service. Fresh fruits and vegetables moving long distances continued to be transported predominantly by rail, but short and intermediate hauls went by truck. By the late 1950's, unloads of several of these perishables at selected cities for which such data were collected were so predominantly by truck that the Market News Service discontinued reporting unloads by mode of transport. Traffic reports by railroads to the ICC show that railroads have not regained that traffic, but are continuing to lose it. For 10 selected perishables, rail traffic declined somewhat steadily from nearly 14 million tons in 1954, when trucks were already well established as a mode of transport for perishables, to about 8 million tons in 1969. Included was a drop in livestock tonnage from about 5 million tons to less than 1 million tons.

Truckers hauling exempt agricultural products and firms, including farmers, hauling their own products are not required to report traffic statistics to the ICC. Census data show that farmers own about a third of all U.S. trucks. Data on truck shares of total traffic in unmanufactured agricultural products are not available. Some inferences can be drawn from statistics on traffic

reported by railroads and on agricultural output. Since rail traffic in unmanufactured products increased at about the same rate as agricultural products, both perishables and semiperishables, probably changed little if any between 1954 and 1966. Some shift in favor of trucks, barges, or both, may have occurred beginning in 1967, but possibly the drop in rail traffic was caused by other factors, such as a sharp increase in onfarm grain storage.

Table 68.--Estimated ton-miles of all intercity freight traffic, by transport mode, 1950-69

Year	Railroads	Motor trucks	Inland water carriers	Pipe lines	Airlines	Total ^{1/}
----- <u>Billion ton-miles</u> -----						
1950	597	173	163	129	0.318	1,063
1951	655	188	182	152	.379	1,178
1952	623	195	168	158	.415	1,144
1953	614	217	202	170	.413	1,204
1954	557	213	174	179	.397	1,123
1955	631	223	217	203	.481	1,275
1956	656	249	220	230	.563	1,355
1957	626	254	232	223	.572	1,335
1958	559	256	189	211	.579	1,215
1959	582	279	197	227	.739	1,286
1960	579	285	220	229	.778	1,314
1961	570	296	210	233	.895	1,310
1962	600	309	223	238	1.289	1,371
1963	629	336	234	253	1.296	1,454
1964	666	356	250	269	1.504	1,543
1965	709	359	262	306	1.910	1,639
1966	751	381	281	333	2.252	1,747
1967	731	389	283	361	2.592	1,765
1968	757	396	291	391	2.900	1,839
1969 ^{2/} ...	780	404	302	411	3.200	1,900

^{1/} Totals do not always add because of rounding.

^{2/} Preliminary.

Source: Interstate Commerce Commission. Annual reports.

Some estimates of truck shares of traffic in manufactured agricultural products are available from the censuses of transportation for 1963 and 1967. Distribution of traffic among regulated for-hire motor carriers, private trucks, railroads, and all other carriers is shown in table 69 for three groups of manufactured foods. Private trucks accounted for more tons of both

meat and dairy products and candy, beverages, and tobacco products than did railroads or for-hire trucks. However, railroads originated more tons of canned and frozen foods and had the largest share of ton-miles originated for each group of products.

Table 69.--Carrier transportation by shipper group, 1963 and 1967

Shipper group and quantity item 1/	Rail		For-hire : motor carrier		Private : truck		All others	
	1963	1967	1963	1967	1963	1967	1963	1967
	----- Percent -----							
01:								
Tons	27.1	30.2	29.8	32.4	42.6	36.6	0.5	0.8
Ton-miles ..	46.5	46.0	36.2	37.7	16.2	15.1	1.1	1.2
02:								
Tons	59.9	56.1	21.6	19.1	17.4	21.8	1.1	3.0
Ton-miles ..	74.9	73.7	16.8	15.9	6.6	7.2	1.7	3.2
03:								
Tons	22.3	30.2	29.8	29.6	45.7	39.2	2.2	1.0
Ton-miles ..	53.5	56.6	27.5	25.6	15.6	15.0	3.4	2.8

1/ Shipper groups:

01--Meat and dairy products.

02--Canned and frozen foods and other food products, except meat and dairy products.

03--Candy, beverages, and tobacco products.

Source: Bur. of the Census. Census of Transportation, U.S. Dept. of Commerce, 1963 and 1967.

Distribution of tons and ton-miles of traffic among the several carrier groups suggests that the shorter the haul, the greater the probability that products will be shipped by private truck. Conversely, the longer the haul, the greater the probability it will be made by rail. Trends between 1963 and 1967 were not in the same direction for all product groups, but private trucks apparently were relatively less important in 1967 than in 1963.

In 1935, the Interstate Commerce Act was amended to bring trucks moving interstate under ICC regulation. The ICC studies the structure and performance of the regulated for-hire trucking industry and controls rates, routes, and services as deemed desirable. Entry applications are filed frequently; each results in review of the structure of the industry for the particular transport market the applicant proposes to enter. Shippers and truckers are given the chance to express views or present evidence of need for the proposed service.

An estimated 11,369 exempt for-hire trucking firms were operating in 1963, according to the Census of Transportation. Most of these firms were quite small, operating only one or two trucks. Twenty-one percent of total vehicles were operated by one-truck firms, and more than 60 percent by firms with six or fewer trucks (table 70). Comparable data from the 1967 Census of Transportation are not yet available, so trends in the size of exempt trucking firms are not known. Apparently, carrier operating costs are not greatly affected by size of firm, though they are in certain capital-intensive industries. Thus, there may be no strong economic forces operating to change the structure of the exempt for-hire trucking industry.

Table 70.--Exempt interstate for-hire motor carrier, by size of fleet, 1963

Size of fleet (vehicle)	Vehicles	Share of total for-hire motor carriers
	<u>Number</u>	<u>Percent</u>
1	6,406	21.0
2	3,826	12.6
3 or 4	5,034	16.5
5 or 6	3,245	10.6
7 to 10	4,100	13.5
11-20	2,981	9.8
21-50	2,525	8.3
51-100	1,467	4.8
Over 100	899	2.9
Total	30,483	100.0

Source: Miklius, Walter. Comparison of For-hire Motor Carriers Operating Under the Agricultural Exemption with Regulated Motor Carriers, Econ. Res. Serv., U.S. Dept. Agr., Mktg. Res. Rpt. 769, Aug. 1966.

The ICC does not review nor regulate structure, conduct, and performance of this part of the trucking industry. Pricing and output decisions of exempt truckers probably are made following approximations of marginal costs. Rates seem to reflect closely costs of providing services and also are closely related to distance, a principal cost element.

Aggregate estimates of cost and revenue per vehicle mile suggest that exempt and regulated truckers profit equally per vehicle mile, which is expected in an industry with capital costs that are minor relative to variable costs. However, exempt truckers apparently earn profits at a lower level of cost and revenue per vehicle mile than do regulated truckers. The main reasons probably are that exempt truckers usually haul full loads, provide no terminal services for less-than-truckload assembly, and move directly from origin to destination with no route restrictions or need for interchange with

connecting carriers. Exempt truckers are not required to publish tariffs and submit records of costs, traffic, and so on. Thus, their average costs are lower per vehicle mile than are those of regulated truckers.

Water Carriers

Barges represent the third major type of carrier hauling agricultural products, principally grains. Several factors restrict use of barge service in agricultural marketing. More so than railroads, barges are bulk carriers and large volumes of freight must be accumulated. Barge service is generally slower than that of trucks or railroads. In addition, barges must service locations on navigable waters, so they cannot provide nationwide service. But they do provide low-cost transportation for bulk commodities.

Water carriage is performed on publicly owned rights-of-way; thus, shippers have the right to operate their own fleets. In 1956, private carriers operated about a third of all barges, while exempt (bulk) carriers accounted for two-fifths of the total (table 71). Division of water traffic among regulated, exempt, and private carriers in 1964 is shown in table 72.

Air Transport

Air transport of breeding livestock, baby chicks, fertile eggs for hatching, floral products, and highly perishable foods such as strawberries has grown rapidly since the advent of jet planes. Export of most of these products to European and Asian markets was almost totally nonexistent before air freight movement.

Although air freight is considerably more expensive than rail or truck for major domestic food commodities moving in truckload or carlot quantities, some air traffic in these commodities has developed. Such shipments are made as needed to meet unexpected market situations, to supply restaurants and other eating places where freshness is at a premium, and so on. The speed of air transport, coupled with the airlines' ability to accept small units for shipment, suggests a growing use of airplanes to supplement surface transport and open up new markets.

Implications of Intermodal Competition

The most striking structural changes in the transportation industry revealed by available data are the rapid growth over the past two decades of nonrail modes of transportation and the relative though not absolute decline of railroads as freight carriers. These traffic shifts resulted from competition of intermodal rates, services, or both. Competition can occur either unilaterally; that is, firms of a single mode undercut the rate, service, or both, offered by firms in another mode; or bilaterally; that is, firms in both modes act and react to competitors' offerings.

Table 71.--Inland waterway operators, 1956 1/ and 1965 2/

Type of carrier	Firms	Towing vessels	Barges
		<u>Number</u>	
1956:			
Common	163	716	2,665
Contract	41	95	675
Exempt contract	1,007	2,624	6,176
Private	521	854	4,692
Total	1,732	4,289	14,208
		<u>Percent</u>	
Common	10	17	19
Contract	2	2	5
Exempt contract	58	61	43
Private	30	20	33
Total	100	100	100
		<u>Number</u>	
1965:			
Total	1,700	3,865	17,085
		<u>Percent</u>	
Regulated by ICC	8	--	--
Exempt	68	--	--
Private	24	--	--
Total	100	--	--

Note: Information shown for 1956 has not been collected in this way since then.

1/ Hearings before a Subcommittee of the Committee on Interstate and Foreign Commerce, House of Representatives, 84th Congress, 2d Session, Transportation Policy, Wash., D.C., 1956, p. 1513.

2/ Amer. Natl. Waterways Operators, Inc. Big Load Afloat, Wash., D.C., 1956, p. 60.

Table 72.--Waterborne intercity domestic traffic, by area of operation and regulatory status, 1964 ^{1/}

Area	Total		ICC-regulated		Exempt for-hire		Private	
	Ton-miles	Percent	Ton-miles	Percent	Ton-miles	Percent	Ton-miles	Percent
Coastal	311.9	64	18.9	35	97.9	49	195.0	82
Lake	73.2	15	16.9	31	37.0	19	19.3	8
Internal	101.9	21	18.2	34	63.3	32	20.4	9
Intraport and local	1.8	2/	2/	2/	.9	2/	.9	2/
Total	488.8	100	54.0	100	199.2	100	235.6	100
Distribution by regulatory status								
	Percent							
Coastal	100		6		31		62	
Lake	100		23		50		26	
Internal	100		18		62		20	
Intraport and local	100		0		50		50	
Total	100		11		41		48	

^{1/} Totals may not equal sum of items because of rounding. Percentages calculated before rounding.

^{2/} Less than 0.5 percent.

Source: U.S. Dept. Army. Waterborne Commerce of the United States, Calendar Year 1964, Water Carrier Ton-Miles, Corps of Engineers, Suppl. 2 to Part 5, Natl. Summary. p. 9.

Rail rate trends for agricultural products suggest that railroads resisted rate adjustments to meet growing competition from trucks and water carriers up to about 1958, but reacted through prices to their dropping traffic shares thereafter (fig. 4). While the railroads' share of all intercity traffic (table 68) has continued to fall since 1958, the decline has been at a slower rate. Perhaps their price reactions were partially effective in stabilizing market shares.

Based on quantities of food marketed to domestic consumers and rail freight rate indexes for domestically produced and consumed foods, cost of shipping farm food products was estimated at \$5.2 billion for 1970, up \$1.2 billion from 1960 (5). However, the transportation component of the food marketing bill (total costs and profits of processing and distributing farm foods) was 7.6 percent in 1970 compared with 9.3 percent in 1960. Transportation companies

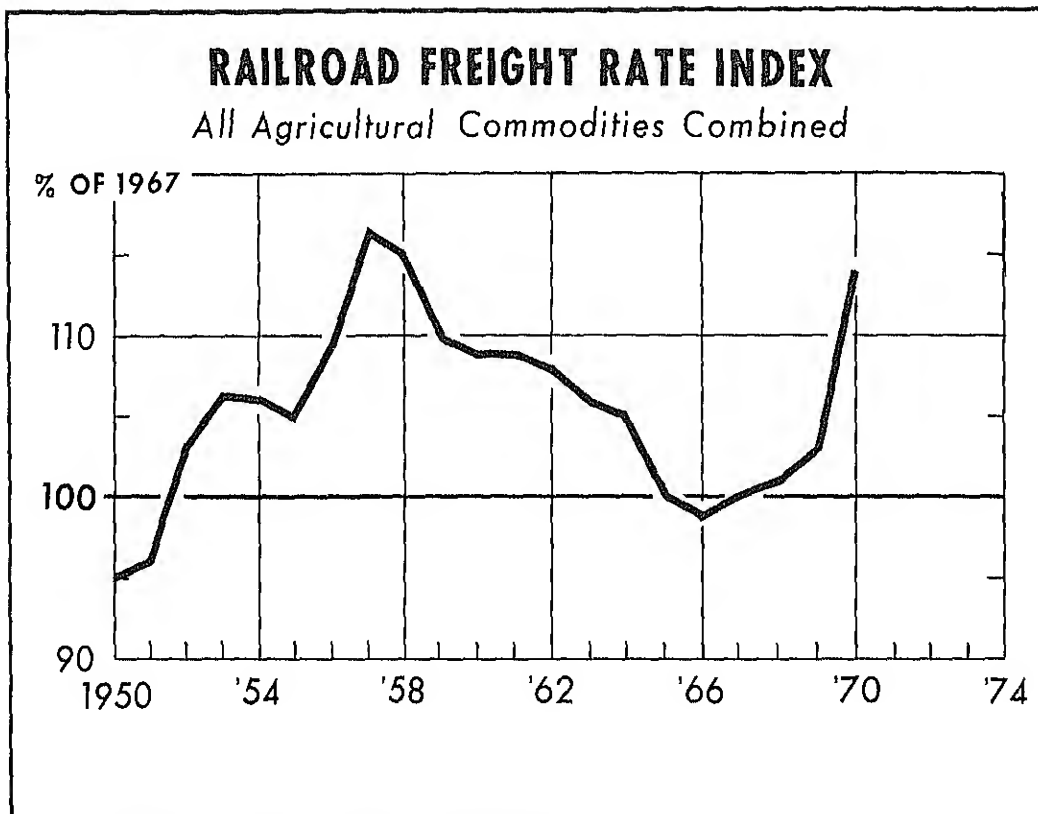


Figure 4

probably experienced somewhat the same trends over this period in costs per unit of input as did other marketing firms. Thus, the declining share of the marketing bill represented by intercity transportation flowing from rate competition beginning in the late 1950's apparently either reduced profit margins of the transportation industry or was accompanied by somewhat greater productivity gains in transportation than occurred in food marketing industries.

LITERATURE CITED

- (1) Bureau of Economics
1971. Current Trends in Merger Activity. Fed. Trade Commis., Stat. Rpt.
No. 8, Mar.
- (2) Devino, G. T.
1969. Economies of Size in Fluid Installations. Amer. Dairy Rev., Aug.
- (3) _____
1969. Economies of Size in Large Fluid Milk Processing Plants. Vt. Agr.
Expt. Sta., MP 62, May.
- (4) Economic Research Service
1966 Production and Marketing Practices of the Fruit and Vegetable
Processing Industry. U.S. Dept. Agr., 1966.
- (5) _____
1971. Marketing and Transportation Situation. U.S. Dept. Agr., Aug.
- (6) Fallert, Richard F.
1970. A Survey of Central Milk Programs in Midwestern Food Chains. Econ.
Res. Serv., U.S. Dept. Agr., and N. Central Expt. Sta., Mktg. Res.
Rpt. No. 944.
- (7) Federal Trade Commission
1967. Enforcement Policy with Respect to Mergers in the Food Distribution
Industries, Jan. 3.
- (8) _____
1969. Economic Report on Corporate Mergers. Staff report.
- (9) Lasley, Floyd A.
1966. Coordinating the Fluid Milk Supply in the Pittsburgh Market. Econ.
Res. Serv., U.S. Dept. Agr., Mktg. Res. Rpt. No. 746, Mar.
- (10) Lyng, Richard E., Assistant Secretary of Agriculture
1970. Statement in Hearings Before the Subcommittee on Dairy and Poultry.
91st Cong., 2d Sess., Sept. 14-15, Ser. GG., U.S. Govt. Print.
Off., Wash., D.C.
- (11) MacFadden-Bavtall Corporation
1969. The Discount Merchandiser. New York, N.Y., June.
- (12) National Commission on Food Marketing
1966. Organization and Competition in Food Retailing, June.
- (13) _____
1966. Organization and Competition in the Fruit and Vegetable Industry.
Tech. Study No. 4, June.
- (14) Progressive Grocer
1971. 38th Annual Report of the Grocery Industry, Apr.

- (15) Rogers, G. B., Gallimore, W. W., and Faber, F. L.
1968. Shifts in the Location of Eggs, Broiler, and Turkey Production.
Econ. Res. Serv., U.S. Dept. Agr., PES-254, Nov.
- (16) Supermarket News
Jan. 12, 1970; Jan. 11, 1971.
- (17) U.S. Department of Agriculture
1970. Mergers and Acquisitions in Three Food Industries. Mktg. and
Transp. Sit., Feb.
- (18) Van Dress, Michael G., and Freund, William H.
1968. The Food Service Industry: Its Structure and Characteristics,
1966. Econ. Res. Serv., U.S. Dept. Agr., Stat. Bul. 416, Feb.
- (19) Velde, Paul
1970. The Impact of Transit and Nontransit Transportation Rate Structures
on the Soybean Processing Industry. Unpub. Ph.D. disser., Purdue
Univ., Jan.
- (20) Webster, Fred, and others
1963. Economies of Size in Fluid Milk Processing Plants. Vt. Agr. Expt.
Sta. Bul. 636, June.

